Annual Report of Session 1948-49

Teaching and Lectures

In addition to the courses covering the syllabus for the Academic Diploma in European Archaeology that have been maintained on the lines described in previous Reports, Professor R. E. M. Wheeler instituted a course on Roman Britain in Autumn and Spring terms for the benefit of students reading Ancient History for the B.A. Degree and for the Diploma in European Archaeology B or Classical Archaeology. In addition to these regular courses the experiment was tried of a short course of eighteen lectures on "Outlines of British Archaeology," at 6.30 p.m. in Autumn and Spring terms. The prehistoric period was covered by Professors Childe and Zeuner, the Roman period by Miss Kenyon and Professor Wheeler, and the Anglo-Saxon period by Mr. Bruce Mitford. Though the course was arranged at an hour when people employed during the day could attend, the audiences were consistently poor. So the experiment will not be repeated.

In the Department of the Archaeology of Western Asia Professor Mallowan continued his course on "The Rise of Civilisation in the Near East" during Summer term while Miss Kenyon lectured on the Archaeology of Palestine during Autumn and Spring terms.

A course of six public lectures on "Recent Work in Roman Archaeology," held on Fridays at 5.30 in Autumn term, drew large audiences. The themes covered India, China, Pakistan, Afghanistan, Central Asia and North Africa, as well as Roman London, Wales and Air Survey. In addition to Professor Wheeler and Miss Kenyon, Dr. E. V. Nash-Williams, Mr. W. F. Grimes, Dr. Ian Richmond and Dr. J. K. S. St. Joseph contributed lectures.

Dr. R. E. M. Wheeler delivered his Inaugural Lecture as Professor of the Archaeology of Roman Provinces on October 7th, taking as his title "The Archaeology of the Roman Provinces and Beyond." The Vice-Chancellor, Professor Penson, took the chair on this occasion. Professor K. de B. Codrington's inaugural lecture, "The Place of Archaeology in Indian Studies," was delivered on October 28th with the High Commissioner for India, Mr. V. R. Krishna-Menon, in the chair.

In March 1949 Dr. L. Bernabó Brea, Superintendant of Antiquities in South-East Sicily and Director of the Museum at Syracuse, gave three public lectures in French; the first two were devoted to an account of his own excavations at Arene Candide in Liguria—a cave which contains a splendidly

stratified series of prehistoric cultures from Palaeolithic to Roman times—while the third dealt with the Prehistory of Sicily and is printed in this volume. Finally, in April, Professor J. Brøndsted, of Copenhagen, gave three University Lectures in Archaeology at the Institute, his title being "Tribes and Peoples in Scandinavia during the Stone and Bronze Ages."

Once more the Prehistoric Society held a three-day Conference at the Institute after Easter, the subject being "Houses and Farms."

Exhibitions and Excavations

In connection with the Prehistoric Society Conference an exhibition of models, plans and photographs was organised to illustrate prehistoric housing in Britain and on the Continent. Models of a two-roomed wooden house in Würtemberg, of a Skara Brae hut and of a wheel-house in North Uist were constructed in the Technical Department, while the British and Medieval Department of the British Museum kindly lent models of the Iron Age A round house from Little Woodbury and of a "rath" at Ballykeagan (Isle of Man).

During the summer of 1948 the Institute co-operated with the British School at Rome in the excavation of Sabratha in Tripolitania. Miss Kenyon acted as Field Director under Dr. Ward Perkins, Director of the School; Mr. Cookson acted as photographer to the expedition and several students of the Institute assisted in the excavations. Mr. Cookson's photographs were so excellent and of such general interest that it was decided, in conjunction with the British School at Rome, to arrange a public exhibition of the photographs, accompanied by a film taken of the work of the Institute. The Exhibition was formally opened by H.R.H. the Princess Royal on June 9th and remained open for two weeks.

Students

Eight students have been registered at the Institute for the Academic Diploma in European Archaeology (A), two for part B of the same Diploma, and one for that in Western Asiatic Archaeology. Five of the students took the examination for the Diploma in European Archaeology (A) in June and all passed, one being awarded Distinction, while one student gained the Diploma in the Archaeology of Western Asia at the same time. For higher degrees, three students at the Institute are registered for the Ph.D. and three for the M.A. Six students have been giving full time attendance on courses in the Technical Department. In addition, twenty students have paid fees for various courses, while thirty-two inter-collegiate students have been attending the lectures on Prehistoric Archaeology and on Roman Britain.

The Director has taken students in Prehistoric Archaeology for a full

day excursion to Lewes and for Whitsun weekend to Salisbury, Stonehenge and other sites in that district, while Professors Zeuner and Wheeler have also taken their students to relevant sites in the vicinity of London. During August Professor Wheeler has conducted a training school for excavation technique at St. Albans, which, though not restricted to students of the Institute nor financed by it, has been utilised by several of our students, while Mr. Cookson has undertaken the photographic side of the course.

Collections

During the Session the Institute's collections have been enriched by several generous gifts. We can mention here only the addition to the palaeolithic collection of specimens displayed at the Exhibition held the previous August, and now presented by J. Desmond Clark, Esq., from the Rhodes-Livingstone Museum, Northern Rhodesia, Dr. L. S. B. Leakey from the Coryndon Museum, Nairobi, Professor C. van Reit Lowe, from the Archaeological Survey of the Union of South Africa, R. Summers, Esq., from the National Museum of Southern Rhodesia, and Dr. E. Ashworth Underwood from the Wellcome Historical Medical Museum; to the Western Asiatic Department collections of sherds from Iraq, mostly from Hassuna, presented by the Department of Antiquities and from Mersin, Cilicia presented by the Turkish Government; and to the Palestinian Department a collection of small finds from Jericho and slides and photographs of this site, and of Tell Duweir, presented by Lady Marston. The Indian Department has received a gift of three Gandhara sculptures from Dr. W. L. Hildburgh, F.S.A., and collections of prehistoric sherds from the Dominion of Pakistan through Miss B. de Cardi.

The Department of Environmental Archaeology

Report for 1948-49

By Professor F. E. Zeuner

Activities and Staff

The reorganisation of the teaching collections was continued after the acquisition of a new cabinet of drawers in which the collection of Lower Palaeolithic artifacts is to be housed. Reading matter for students of the Environmental Course was extracted and edited. This is necessary because of the absence of suitable text-books. Most of the extracts deal with second-term matter (fauna and flora, domestication of animals and cultivation of plants). A disproportionately large amount of time had to be allotted to correspondence (910 letters sent out). Twenty requests to study samples submitted to the Institute were accepted, and 255 samples were analysed or determined in the Department. Thirty-one other enquiries were answered by letter after investigations not requiring work in the laboratory.

Miss J. Sheldon continued as technical assistant, and Miss M. Howard helped with the teaching collections, both by collecting material in the field and by classifying it. She also spent much time and patience on the reconstruction of animals and of environment in general. During my absence in India, Mr. I. W. Cornwall acted as head of the Department, and gave a large proportion of the courses.

Laboratory

The chief addition to the equipment during the year was a G.E.C. Direct Reading pH-Meter and Millivoltmeter, which replaces the less reliable colorimetric methods of pH-determination in the laboratory. A Contax camera with tele-objective was acquired for accurate colour-photography of sections of soils and excavations, and for detailed photography of museum and other specimens outside the Institute, where the facilities of the Photographic Department are not available. An improved Abney-level combined with a prismatic compass has replaced a smaller, privately-owned instrument for fieldwork on river-terraces. A pipette stand for mechanical analysis was

designed and specially made. Its use will shorten the very lengthy process of mechanical analysis. The necessary pipettes are not obtainable in this country at short notice. We are much indebted, therefore, to Sir K. S. Krishnan, Director of the National Physical Laboratory of India, for having a sample pipette made in his workshop while I was visiting New Delhi.

Collections

The collection of raw materials and rocks has increased by about 500 specimens. The making of explanatory labels enabling the student to study the collection by himself with the aid of a book has been started. The collection of soils is now in complete working order and provided with the necessary reading matter. It is hoped to extend this system to the osteological collection in the course of the next year. The Lower Palaeolithic collection has been increased by purchases from the Corner Collection, mainly of British Acheulian and Levalloisian. The scarcity of French material is still serious.

Donations of specimens are gratefully acknowledged from the Wellcome Historical Medical Museum (Lower Palaeolithic), Miss M. Howard, Mr. E. Pyddoke and others.

The dioramas have proved most useful in the teaching of environment. A new one is under construction, at half the scale of the older set, showing a scene with hippopotamus and straight-tusked elephants on the banks of the Thames near Chertsey. It is intended to illustrate conditions of life of Acheulian man.

Teaching

Apart from the usual courses, instruction was given to one Ph.D. candidate and one research student.

During my absence in India, Mr. Cornwall gave the majority of the lectures and also a special course in mammalian osteology for technical students. Special subjects were covered by the following lecturers: Professor K. de B. Codrington (London), Mr. C. G. Dobbs (Bangor), Dr. H. Godwin (Cambridge), Professor S. E. Hollingworth, and Dr. W. Jackson (Manchester).

Thirteen lectures were delivered while in India, in the universities of Bombay, Poona, Calcutta and Benares, and to various colleges and societies; four other lectures were given outside the Institute. Five days were spent with students in the field, the average attendance being six.

Research

Four months were spent on a tour of the Dominion of India on behalf of the Department of Archaeology of the Government of India, and of the

Deccan College Postgraduate Research Institute. The purpose of this visit was to study deposits containing Palaeolithic industries and to initiate Indian scholars into the methods of geochronology and research in environment and Stone Age industries.

As interest in the phenomena of raised beaches has been increasing in recent years, since they afford one of the best means of dating and correlating Palaeolithic industries, work on raised beaches has been continued. Observations made in Jersey in 1947 have been worked out and localities in southern England visited. A chronological table summarising recent work in the Mediterranean and in Europe is being prepared.

A visit was paid to the Musée d'Histoire Naturelle in Paris to study the unique skeleton of *Elephas meridionalis* with the view to attempting a new reconstruction of this species.

Work on a number of British sites was carried out under the supervision of the Department by Messrs. Cornwall and Pyddoke, and by Miss Howard. Some notes appear elsewhere in this Report.

Library Report, 1948-49

THE Library Report figures show a continued increase in its use. Though the highest monthly figure was rather less, the average increase was marked; over 200 volumes were borrowed during each of four months and over 150 per month during the rest of the year, except for the summer vacation.

Accessions of books and periodicals were not quite so numerous as the previous year, but the *Lantern Slide* collection increased enormously, with the addition of 1,492 new slides. Temporary cataloguing assistance was continued, Miss Joan Rogers being employed throughout the Autumn term and Miss Ellen Macnamara in the Spring term. The greater part of the old collection has now been catalogued with a grand total of 8,124, and is available for borrowing. Appreciation of this service is indicated by the great increase in loans, nearly three times that of the year before.

The Librarian was absent on three and a half months' special leave during the Spring term, Miss G. C. Talbot, Assistant Librarian, acting as Librarian during that period.

Towards the end of the year the Iraq Library was withdrawn and sent to Baghdad.

Volumes added to the Library	459	Volumes bound	275
Pamphlets added to the Library	378	Volumes lent	1,864
Periodicals added	200	Highest month, November 227	
Lantern slides added	1,492	Lowest month, August 62	
Volumes presented	50	Volumes borrowed from outside libraries	147
Pamphlets presented	339	Lantern slides lent	794
Volumes and pamphlets on loan	2		
Volumes and pamphlets exchanged	56		

Donors of books and pamphlets:—

Ashmolean Museum, J. E. Bartlett, A. G. Bell, T. Burton Brown, Professor Gordon Childe, C.I.B.A. Review, Coryndon Memorial Museum, I. W. Cornwall, Mrs. M. A. Cotton, O.B.E., Council for British Archaeology, J. D. Cowen, O. G. S. Crawford, Henry Field, Foreign Office (German Section), Professor John Garstang, C.B.E., 18th International Geological Congress, Gudmund Hatt, Professor C. F. C. Hawkes, Dr. H. O'Neil Hencken, Archaeological Survey of India, Neville Jones, Miss P. M. Keefe, J. Kirkman, A. D. Lacaille, Dr. L. S. B. Leakey, A. W. G. Lowther, G. P. Marinos, I. D. Margary, D. H. Montgomerie, Dr. H. L. Movius, Dr. M. A. Murray, Nicholson Museum (Sydney), Miss T. M. I. Newbould, C. D. P. Nicholson, K. P. Oakley, B. H. St. J. O'Neil, Miss F. M. Patchett, Canon Paterson, E. Pyddoke, Sir Lewis Ritchie, H. M. E. Schürman, R. B. Sergeant, J. R. Stewart, Miss G. C. Talbot, Miss du Plat Taylor, C. T. Trechman, Miss O. Tufnell, University College, Professor R. E. M. Wheeler, Professor F. E. Zeuner.

Report of the Technical Department

1948-49

THIS year eighteen students have attended courses in the Technical Department, and our bench-space proves increasingly inadequate.

In the autumn, through the kindness of Monsieur Lavacherie, Directeur en Chef des Musées Royaux d'Art et d'Histoire du Cinquantenaire, Bruxelles, Miss Gedye was able to spend three weeks in the Laboratory there, and had the opportunity of comparing their methods with those in use in this Department. It was a most interesting visit and through the willingness of the Laboratory staff to share their knowledge, it was of great value and should help to improve the standard of technical teaching at the Institute. This and, it is hoped, other visits may also pave the way to closer contact between the Institute and foreign museums, and to a freer interchange of technical information.

Since the installation of the equipment for the electrolytic cleaning of metals, the Department has been able to undertake more of this type of work. This year we have been approached by the following Museums and Societies with a view to treating their collections of metal objects:—

Folkestone Museum
Worthing Museum
Dartford Museum
Basingstoke Museum
Otago Museum, New Zealand
Shakespeare's Birthplace
Birmingham Archaeological Society
Sussex Archaeological Society
Sabratha Excavation Committee.

A considerable amount of this work has already been completed. Owing to the increase in volume of this side of the work, we have installed an electric water-still, a buffing machine, and a small power-driven flexible-shaft engine. These items of new equipment materially accelerate finishing objects for exhibition.

Pottery restoration work has been undertaken for the Museums of Lincoln and York, for the Duchy of Cornwall, the Sabratha Excavation Committee,

and for seven private individuals. The most interesting items were thirteen very fragmentary Late Bronze Age cinerary urns.

Early in the year, Miss Gedye had the opportunity of working at the British Museum (Natural History) on the restoration of the *Bos primigenius* skull presented to the Institute by Mr. R. J. C. Atkinson. The work was completed with the advice and under the supervision of Mr. L. E. Parsons, chief Preparator of the Department of Geology. As a result of the instruction received, the Technical Department has been able to undertake the repair and restoration of bones for the Environmental Department, and students are now regularly receiving instruction in this branch. Notable individual pieces of work by students have been the preparation and part articulation of the recent skeleton of a dog for comparative purposes, and the preservation and repair of a very fragmentary and friable scapula of *Elephas cf. antiquus* from the Swanscombe Middle Gravel.

Three-dimensional relief-maps of the Near and Middle East are being prepared for the Department of Western Asiatic Archaeology. These are designed to give visual demonstration of the geographical factors governing migrations and trade routes.

Three scale-models of prehistoric dwellings were made by the Department, with the help of Miss Howard, for the Exhibition of Prehistoric Housing held at the Institute at Easter in connection with the Prehistoric Society's Conference. These were a Middle Neolithic thatched house from Aichbühl, a late Neolithic stone hut from Skara Brae, and a second century A.D. "wheel-house" from Clettraval, North Uist. Preparation of several further dioramas for the Department of Environmental Archaeology is contemplated and a beginning has been made on a scene on the Thames at Chertsey in Great Inter-glacial times.

Report of the Photographic Department

1948-49

DURING the year several outstanding events have relieved the usual routine of producing photographs, lantern slides and prints for the Institute's many departments and outside bodies.

Calls upon the Photographic Department for advice, general assistance and help with photography have increased on that of last year, showing a slow steady upward trend. All the demands have been different; all have been extremely urgent, but the wide contacts available have proved useful and have enabled all demands to be met on time. The Institute has also been able to lend a little equipment to one small excavation and it could have helped two further excavations in a like manner.

This year, on the occasion of the Prehistoric Society's Conference of April 1949, the Department did not make any special display owing to the Exhibition of the Prehistoric Housing, since the 196 sq. feet of display boards held sufficient photographs to illustrate how photography could be employed.

SABRATHA EXPEDITION

At the end of last session leave of absence was granted to Mr. M. B. Cookson to proceed to North Africa in order to assist in the Expedition to Sabratha organised by the British School at Rome, under its Director, Mr. J. B. Ward Perkins. Travel to the site was overland by rail to Naples and thence by ship to Tripoli, since so much equipment, photographic, survey, stationery, etc., had to be taken; in two instances delivery of the equipment was only made the day prior to departure. Processing of the negative stock was carried out on the site, in a disused kitchen which was converted into a darkroom; prints were made by the Italian Photo-Section in Tripoli.

Photo-records of drawings of potsherds and small relics for the Finds Register were made on a Photo-Mechanical Paper, a new departure working entirely on paper negatives. This saved time and money, three prints being made from each paper negative, the prints being cut up and pasted into the Register; thereby we avoided drawing the same item three times. Approximately 600 prints were made in this fashion, and, whilst it was recognised that the results were not suitable for publication, they were obtained cheaply and quickly, and were to scale, while records by this means were easily kept

up to date. It is satisfactory to record that the stock, estimated at the start to last the trip, did so exactly, since the last bottle of used developer was poured away the night prior to departure for home. We had special reason to be thankful that there was only one *Ghibli* or sandstorm—and that on a Sunday —and that Sala, an Arab who proved to be a staunch friend and helper, had been allotted for photographic work.

Much was learnt by the trip which can be placed at the disposal of others.

Another outstanding event in the photographic year was an Exhibition of the work done at Sabratha, which was opened on June 9, 1949, by H.R.H. The Princess Royal.

In all about eighty-five photographs were shown, all of which were made 15 in. × 12 in. and placed on 24 in. × 18 in. mounts. Amongst them were three panoramas of approximately 3–5 feet long and one 5 ft. × 4 ft. enlargement, the whole being displayed on eighteen boards with a total board coverage of 502 square feet. There were also some thirty-five coloured transparencies which were shown to the general public three and four times per day.

A short film was also exhibited, showing the lifting of a mosaic pavement and some colour sequences of the Forum and Theatre. From its preparation much was learnt of film technique which will stand in good stead when future efforts in this direction are undertaken.

Apart from the battens for the display boards and drawing pins, the whole construction and lay-out was carried out within the Institute's four walls, and credit is due to Messrs. Manson and Arnold and some students for the "after hours" work they put into this Exhibition with such fine enthusiasm and co-operation. Thanks are also due to Mr. Gallagher, a member of the Expedition who, whilst in indifferent health, lettered the excellent Introductory Poster and was responsible for the hand-written titles. The attendance and interest of the photographic manufacturers and photographic press was exceedingly encouraging. Lastly, Mrs. Conlon, Mr. Cookson's assistant, who never for one moment lost her faith, belief or enthusiasm in the Exhibition, must not be forgotten. Apart from its value in showing the outside world what is happening in Archaeology (and the "man in the street" is intensely interested and keen), the arranging of the show cases of pottery and placing of prints on boards did provide an opportunity to carry out actual display work for the students who are taking the Technical courses.

Attendance after the opening day was good. On an average sixty members of the public visited the Exhibition every Saturday and twenty to thirty on weekdays, not counting one class of thirty boys with their master.

Several applications from Universities and Archaeological Societies have been received for the loan of the Exhibition, and the matter of organisation

and distribution is now under discussion with the authorities of the British School at Rome.

In future work it is planned to make a film with the co-operation of the Technical Department, dealing with restoration in the field and the repair of pottery and metals.

The number of private clients that have placed their work with the Institute's Photographic Department has increased since last year by 25% and the amount of work completed at the time of going to press is approximately 1,906 lantern slides and 3,063 prints. The term "prints" includes enlargements which range in size from 8 in. × 10 in. to 20 in. × 24 in., and are made from all sizes of negatives, from 35 mm. to wholeplate (6½ in. × 8½ in.).

The re-arrangement of the Cyprus Gallery to serve as an additional Lecture Room, necessitated another screen and lantern and these are duly shown in in the list of equipment procured during the year.

Additions to Existing Equipment:—

A range finder Retina Camera, 35 mm.
A Paillard-Bolex 16 mm. film camera.
A Paillard-Bolex 16 mm. film projector.
8 ft. × 8 ft. Opaque Screen.
Lantern Slide Projector.

The Prehistoric Culture Sequence in Sicily

By Dr. L. Bernabó Brea

Our knowledge of Sicilian prehistory is mainly due to the late Senator Paolo Orsi, who was Director of Antiquities in Sicily and of the Archaeological Museum at Syracuse for nearly half a century, from 1888–1934. When Orsi reached Sicily from his native town of Rovereto (Trento) only a minimal amount of information on Sicilian prehistory was available and that was virtually confined to the pages of Baron von Adrian's work, *Prähistorische Studien aus Sizilien.*[1] On Orsi's death Sicily had become the best-known region in the whole of Italy from the standpoint of prehistory, and almost the best known in the whole western Mediterranean basin. Thanks to his indefatigable field work we have come to know a great number of domestic sites and cemeteries from all periods of Sicilian prehistory, and we owe to him the first theoretical scheme tracing the evolution of the local civilisations.

The scheme of four Siculan periods preceded by a pre-Siculan or neolithic period was announced by Orsi as early as 1892[2]; even to-day it still remains quite serviceable in its general outlines although the researches and discoveries of half a century have substantially enlarged and complicated the picture of Sicilian prehistory.

In addition to Orsi, other scholars have made very substantial contributions to Sicilian prehistory. First of all the name of the Cafici brothers,[3] Ippolito and Corrado, who have so fruitfully investigated the problems raised by the neolithic cultures and the Campignian industry in Sicily springs to mind as does that of Senator Angelo Mosso[4] who excavated the stations of Caldare and Cannatello, near Agrigentum. The palaeolithic period in Sicily

[1] F. von Adrian, *Prähistorische Studien aus Sizilien,* Berlin, 1878.

[2] Orsi, P., *Bullettino di Paletnologia Italiana,* XVIII, 1892, p. 208. A full bibliography of Orsi's works is given by Agnello, G., in *Paolo Orsi,* A cura dell'Archivio Storico per la Calabria e la Lucania, 1935, p. 353.

[3] *See* notes 14, 15, 21, 23, 25.

[4] Mosso, Angelo, "Villaggi preistorici di Caldare e Cannatello presso Girgenti," *Monumenti antichi . . . dei Lincei,* XVIII, 1908.

was studied above all by M. Raymond Vaufrey,[1] and it has subsequently been made the object of researches conducted by the Italian Institute of Human Palaeontology.[2] To M. Arias[3] we owe the exploration of the station of Serraferlicchio while Mdme. Marconi Bovio[4] was the first to systematise the material from north-western Sicily and to publish it in a comprehensive survey.

Despite the very valuable work accomplished in the last half century, the archaeological exploration of the island is far from being complete, above all as concerns its prehistory. The distribution of finds on an archaeological map is far from even: some regions have been very diligently explored, particularly the south-eastern region around Syracuse (roughly between the plain of Gela and Etna); for that is the region where Orsi worked. The surroundings of Palermo and Agrigentum are also very well known, but vast areas in the north-east, centre and west of the island remains practically unexplored. And even in the best-known regions much remains to be done. It is, accordingly, too soon to claim ability to present a final picture of Sicilian prehistory. It will, none-the-less, be useful to survey the road already traversed and to try and define the point which our knowledge has reached.

We remarked above that the classification of prehistoric Sicilian cultures drawn up by Orsi in 1892 might still be accepted in its general outlines. But this theory worked out in Syracuse, if it fits the conditions of that region well enough, cannot be imposed without modification, on the whole of Sicily—a very diversified region which, owing to its central position in the Mediterranean, has experienced varied influences and perhaps never underwent a uniform cultural development at any moment in its prehistory. Orsi lacked time to complete his field work by a general synthesis of Sicilian prehistory. This was a task to which other scholars, utilising Orsi's discoveries, have devoted themselves, Colini,[5] Peet,[6] Ducati,[7] Patroni[8] and Pace[9]. Still the fundamental

[1] Vaufrey, R., "Le Paléolithique Italien," *Archives de l'Institut de paléontologie humaine, Mem.* 3, 1928; *id.* "Les éléphants nains des îles méditerranéennes," *id., Mem.* 6, 1929.

[2] Maviglia, C., "Scheletri umani del Paleolitico superiore rinvenuti nella Grotta di S. Teodoro," *Archivio per l'Antrop. e l'Etnol,* LXX, 1941, p. 95. Graziosi, P., Maviglia, C., "La Grotta di S. Teodoro," *Riv. di Scienze Preistoriche,* I, 1946, p. 227; *id.,* "Gli uomini paleolitici della Grotta di S. Teodoro, *Antropologia,* ivi, II, 1947, p. 123.

[3] Arias, P. E., "La stazione preistorica di Serraferlicchio presso Agrigento," *Monum. Antichi Lincei,* XXXVI, 1938.

[4] Marconi-Bovio, I., "La cultura tipo Conca d'Oro della Sicilia Nord–Occidentale," *Monum. Antichi Lincei,* XL, 1944.

[5] Colini, G. A., "La civiltà del bronzo in Italia," II, Sicilia, *Bull. Paletn. It.,* XXX, 1904 e XXXI, 1905.

[6] Peet, T. E., *The Stone and Bronze Age in Italy and Sicily,* Oxford, 1909.

[7] Ducati, P., *L'Italia antica,* Mondadori, Milano, 1937.

[8] Patroni, G., *La Preistoria* (Storia Politica d'Italia), Vallardi, Milano, 1937.

[9] Pace, B., *Arte e civiltà della Sicilia Antica,* Vol. I, 1935.

synthesis of Sicilian prehistory remains the excellent article by the brothers Cafici[1] in the "Reallexikon der Vorgeschichte."

Recently the reorganisation of the museum of Syracuse, which had been completely evacuated during the war, gave us the opportunity for a complete revision of the prehistoric material from Sicily. This revision, in the course of which not a sherd nor a flint in the museum was ignored, has, in some cases, made possible better co-ordination of individual items in the total picture, but has, at the same time, revealed fresh problems. We shall try to recapitulate the results of this work.

Sicily seems to have been inhabited by man only late in the quaternary epoch. Man probably did not cross the straits of Messina till a very advanced phase of the Würm glaciation. In fact, hitherto, no trace of Lower or Middle Palaeolithic industries has been found. The famous *coup de poing* from Alcamo, which had been hailed as evidence for the existence of Lower Palaeolithic man in Sicily, is, in reality, only a Campignian nucleus. Mousterian remains have often been mentioned in Sicily, but they turn out to be, in reality, only surface workshops of the "Campignian" or coarse products of the Upper Palaeolithic period. That is what M. Vaufrey has rightly argued, and his conclusions have been entirely confirmed by subsequent researches.

To the Würmian period must be assigned deposits of red clay containing dwarf elephants, hippopotamus, *Myoxus* (*Leithia*) *melitensis* and hyena which constitute the bulk of the filling of our caves. Now these layers, as their relation to the sea level shows, are contemporary with the Mousterian deposits of Balzi Rossi but contain no human artifacts. It is, perhaps, premature to assert that Mousterian culture never reached Sicily. We can, at least, affirm that not the slightest trace of it has yet been found. On the other hand we have in the island very rich Upper Palaeolithic remains. Until the last few years it had been thought that this culture was restricted to the northern coast of Sicily from the Grotto San Teodoro (midway between Messina and Palermo) to Trapani and the island of Favignana. But recently a certain number of Upper Palaeolithic stations have been identified even in the south-eastern Sicily in the environs of Syracuse (Fig. 1)[2]. But these Syracusan stations really exhibit quite perceptible divergences from the stations of the north-west coast and even among themselves. These differences are doubtless due in some cases to the diversity of the material employed; in south-east Sicily the quartzite utilised in the north-west region for the production of the larger tools is lacking. In other cases they seem to reflect differences of age, but unfortunately up to date we have found no stratified deposits in Sicily. We have never found any-

[1] Cafici, C. e I., *Ebert's Reallexikon d. Vorgesch.* s.v. "Sikuler," "Sizilien," "Cannatello," "Isnello Kultur," "Monte Tabuto," "Pantalica," "Stentinello Kultur."

[2] L. Bernabó Brea, "La Caverna Corruggi," *Ampurias*, XI, 1949.

thing more than a single thin relic bed overlying the red clay with dwarf elephants. In default of stratigraphical evidence any attempt at classification must be based upon typological differences and accordingly remains in the domain of hypothesis.

Practically all the Upper Palaeolithic sites of Sicily belong to the great cycle of cultures characterised by backed blades. They fall within the complex of cultures termed Upper Aurignacian, or, using the terminology of M. Peyrony,

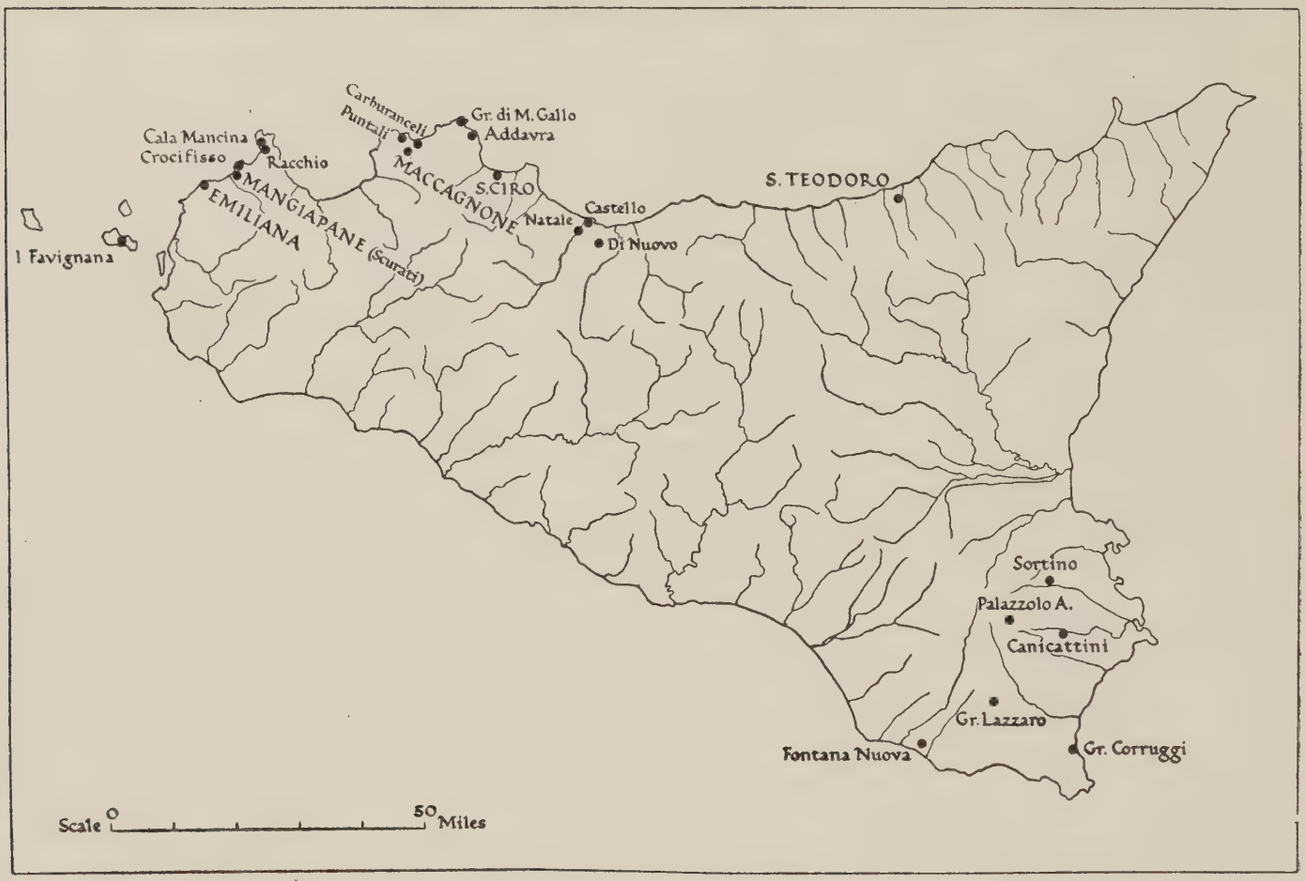


FIG. 1. Palaeolithic sites in Sicily (after Vaufrey with additions)

Upper Perigordian equivalent to the Gravettian of Professor Garrod. The micro-burin appears on most of the sites, but there is at least one, la Fontana nuova near Marina di Ragusa, where the backed blades and other typical Perigordian elements are absolutely missing. It might be thought that the station belongs rather to Middle Aurignacian, but the bone industry, which provides the best type-fossils within that horizon, is lacking. Other sites, such as the Grotto Corruggi of Pachino and the shelter of il Castello at Termini Imerese, exhibit a microlithic character, much more marked than in the remaining Sicilian stations. In them is found a geometric industry, including lunates, which suggests an attribution to the mesolithic. No relation with the

1. Impressed pottery of the coarsest type from Stentinello, Matrensa and Megara Hyblaea, $\frac{1}{3}$

3. Handle in the form of an animal, $\frac{4}{5}$

2. Neck of vase showing stylized human face from Trefontane, $\frac{2}{3}$

1. Cup with impressed decoration from Matrensa, $\frac{1}{2}$

2. Pot with impressed decoration from Stentinello, $\frac{1}{2}$

3. Flask with incised decoration from Matrensa, $\frac{1}{3}$

1. Red monochrome vases from Matrensa, $\frac{1}{4}$

2. Imported painted pottery of the Gravella type from Marmo, near Paterno, $\frac{1}{6}$

3. Bowl from Predio Iozza de Piano Notaro near Gela

1. Painted pottery from Serraferlicchio (after Arias, *Mon. Ant.*, XXXVI), $\frac{1}{5}$

2. Incised pottery from Segesta: Isnello-Moarda style (after Marconi Bovio, *Mon. Ant.*, 1944)

1. Pedestalled bowls painted in three colours from the tomb of Vallelunga, Caltanissetta

2. Mycenaean vases found in Sicily: Top row—Floridia, Agrigentum, Thapsus; below—amphorae from Martrensa and goblet from Cozzo del Pantano, $\frac{1}{10}$

1. Grey Bronze Age pottery from the Matrensa cemetery, $\frac{1}{12}$

2. Grey Bronze Age pottery from the cemeteries of Cozzo Pantano (1), Plemmyrion (2, 3 and 5), Molinello (4) and Thapsos (6), $\frac{1}{5}$

cultures of North Africa has been detected. In the Upper Palaeolithic Sicily seems to have been a dead-end where waves starting in the great Franco-Cantabrian centre of culture died out.

The oldest neolithic culture in Sicily is that of Stentinello.[1] To it belong the fortified villages of Stentinello, Matrensa and Megara Hyblaea, near Syracuse. They are villages girt with a great fosse cut in the rock which at Stentinello and Megara is continuous, but at Matrensa consists of a series of elongated ditches. The latter feature suggests comparison with the causewayed camps of Britain, but the area excavated is too small to decide whether the comparison be valid. The Stentinello culture reappears in villages in the district of Paterno at the foot of Etna—Tre Fontane, Fontana di Pepe and Poggio Rosso—at Bersaglio and Monte Scala near Caltagirone, in the Grotto Corruggi, near Pachino, and finally in the caves of Termini Imerese on the north coast. Just recently Mdme Marconi Bovio has reported it at Paceco near Trapani[2] and has thus shown that this culture was diffused over the whole island, contrary to earlier belief.

The Stentinello culture is already highly evolved, disposing of a surprising wealth of cultural elements; thus it can hardly be called primitive. It is characterised by very beautiful pottery. This is often very highly decorated by impressions made before firing on the moist clay with different types of pointed tools. In many cases, on the contrary, the decoration is very sparse or completely absent.

This pottery falls into two classes: the first and coarser (Plate I, 1) comprises mainly "open forms," i.e. the biggest diameter is at the mouth; decoration consists of impressions of the finger nails, simple lines or sometimes chevrons or dogs' teeth motives. The second class is much finer and more lustrous and shows more elegant and varied ornament. This usually consists of impressions filled with a white chalky incrustation. Closed forms are popular, i.e. those which tend to contract at the mouth. The commonest among them are the flask and globular pots the bases of which are always convex (Plate II). But this pottery includes too great a variety of forms, of handles and of decoration to be defined in a few words (Fig. 2).

The decoration of these wares, though sometimes rich, is at other times on the contrary quite restrained—a few incised lines round the rim interrupted at intervals by a couple of lozenges, perhaps stylisations of human eyes. They

[1] Orsi, *Bull. Paletn. It.*, XVI, 1890, p. 177 (Stentinello); XLVIII, 1928, p. 82 (Bersaglio di Caltagirone); *id. Monumenti Antichi Lincei*, XXVII, 1921 (Megara Hyblaea).
Cafici, C., *Mon. Antichi Lincei*, XXIII, 1915 (Trefontane); *Atti Accad. di Scienze, Lettere e Belle Arti di Palermo*, XII, 1920 (Fontana di Pepe); *Bull. Paletn. It.*, XLI, 1915 supplem. and XLV, 1925.

[2] Marconi-Bovio, I., "Prime traccie della civiltà tipo Stentinello nella Sicilia Occidentale," *Archivio storico per la Sicilia*, VII, 1940.

are the prophylactic eyes which occur more explicitly at Trefontane, on vases that one might almost compare to a human figure (Plate I, 2). But sometimes again these wares are completely bare of ornament. It is interesting to note

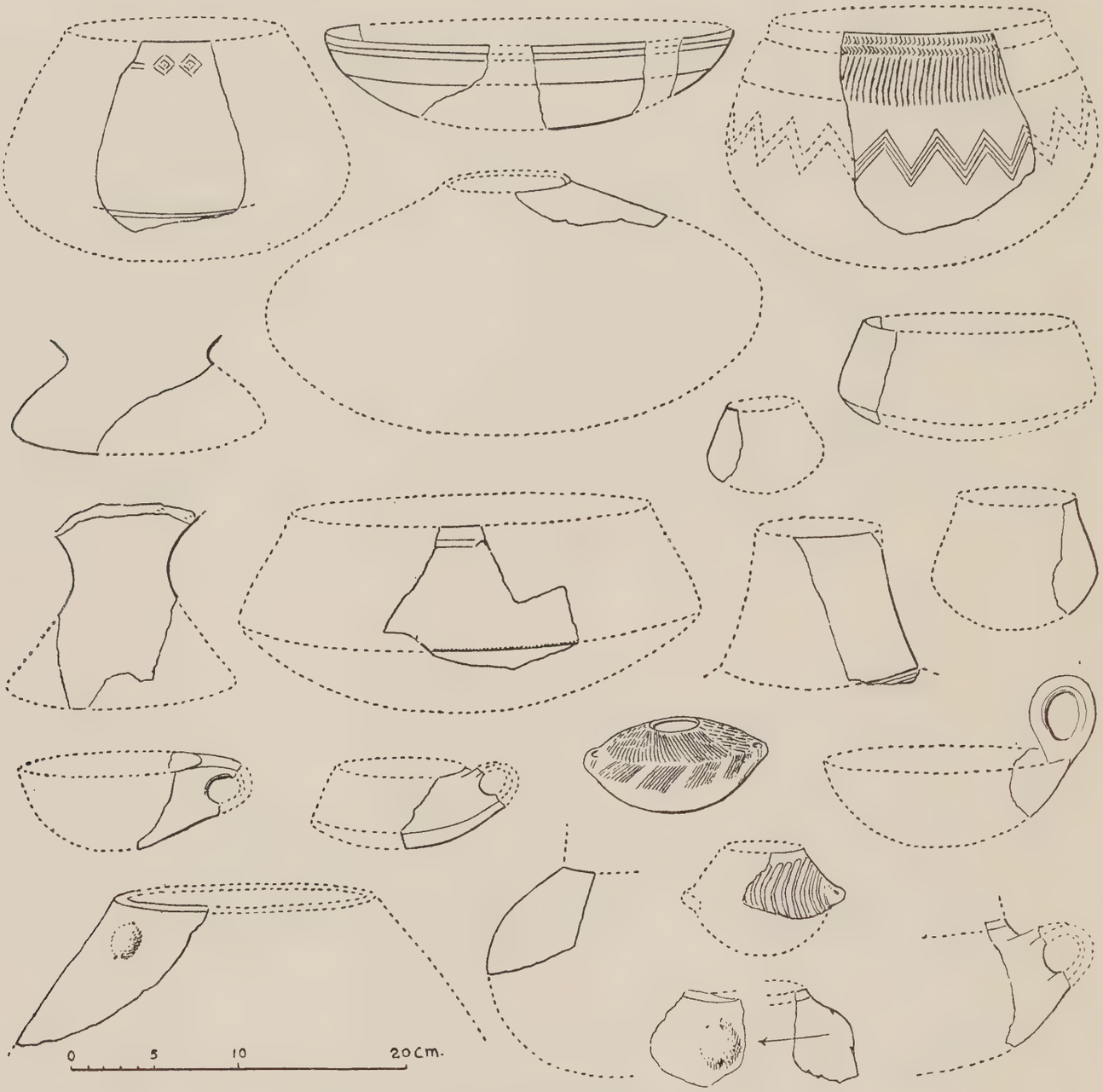


FIG. 2. Types of Stentinello pottery

that the forms of the undecorated, or very simply decorated, pottery often exhibit close resemblance to those that characterise a well-known ceramic class—always undecorated—I mean that "Western pottery" which is found in the Almerian culture of Spain, in the "dolmens" of Portugal and in the culture of Lagozza-Cortaillod. Similarity in form between these classes of

"Western" pottery and those of prehistoric Egypt, especially the Amratian, has often been noted.

What role did Sicily play in the diffusion of these forms towards the Western Mediterranean? It is perhaps premature to attempt to answer that question. It must, in any case, not be forgotten that the same forms reappear also in the neolithic stations of the Adriatic coast of South Italy. The most curious fact is that these Western forms, which in the Iberian Peninsula and in the Lagozza-Cortaillod cultural province are always undecorated, should be associated at Stentinello with a style of decoration, impressed before firing which, in those very provinces, is characteristic of a period sharply distinct from, and anterior to, that to which the undecorated Western pottery is to be assigned. The very fact of such association at Stentinello of two cultural elements which elsewhere are regularly found separated raises interesting problems.

Decoration impressed or incised before firing is appropriate to a horizon, that in the whole western basin of the Mediterranean seems to represent the oldest neolithic culture, Fig. 3.[1] This decoration, which reappears on Leukas and Corfu, is widespread on the Adriatic coast of southern Italy and in the Tremiti islands. It reappears in Sicily in our Stentinello culture and at Malta at the cave of Ghar Dalam. It is found likewise on the Island of Elba, in the caves of the Ligurian coast (Arene Candide and Arma dell'Aquila in the Finale), and further inland at Alba, then in the rock-shelter of Chateauneuf-les-Martigues and other stations in the neighbourhood of Marseilles and once more in the caves of the Gardon (St. Vérédème, Baume Latronne, etc.). On the Mediterranean coasts of Spain such pottery has been called "cardial" since the impressions are quite often made with the edge of a Cardium shell and occurs in the caves of Montserrat (Barcelona), la Sarsa (Valencia), and elsewhere. Finally, in North Africa the same type of decoration is very widespread, from Spanish Morocco and Oran to Tunisia (Redeyef) and Fezzan. Now everywhere this impressed ware belongs to the very beginning of the neolithic cultures, and it reappears in the same chronological position at Mersin,[2] Ras Shamra[3] and other sites in Hither Asia. But nowhere in the Western Mediterranean did impressed pottery attain such a high degree of artistic and technical perfection as in Sicily; nowhere did the culture thus characterised reach an equal wealth and complexity of cultural elements. That is due to the circumstance that in Sicily this culture could continue to

[1] Bernabó Brea, L., *Gli scavi nella caverna delle Arene Candide. Parte I. Gli strati con ceramiche*, Bordighera, 1946; *id.*, in *Rivista di Studi Liguri*, XV, 1949, pp. 24–25.

[2] Burkitt, M., "The earlier cultures at Mersin," *Liverpool Annals of Archaeology and Anthropology*, XXVI, 1–2.

[3] Schaeffer, C., *Ugaritica*, Paris, 1939, p. 4, fig. 2.

develop longer than in other regions, while, on the other hand, the island's position has favoured fruitful contacts with foreign countries.

In fact in southern Italy the Molfetta culture, which represents the oldest local manifestation of neolithic civilisation and which, like Stentinello, belongs to the great cycle of cultures with impressed pottery, was quickly submerged

FIG. 3. Distribution of pottery with impressed decoration in the Western basin of the Mediterranean

by a wave of Balkan culture, richer and more complex, that was characterised by painted pottery, idols and cognate traits (Fig. 4). At the same time in northern Italy the same impressed pottery culture of the lower levels of Arene Candide and Arma dell 'Aquila was overlayed by a wave of Danubian cultures bringing square-mouthed vases, white painting on a brown ground, false-relief decoration, idols, little socketed ladles, etc. This wave of culture from the Balkans and the Middle Danube basin, which impinged upon Italy, did

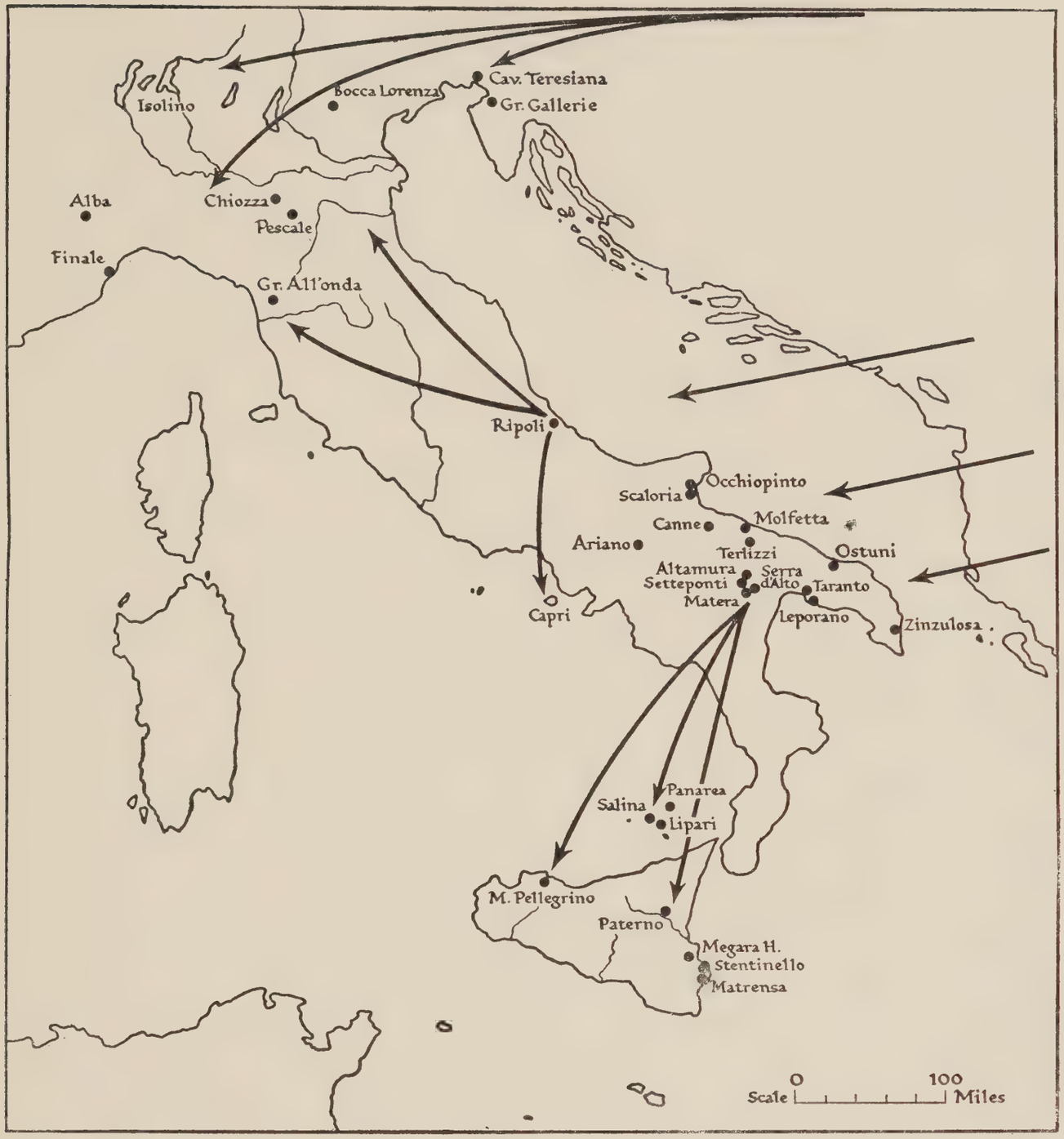


FIG. 4. Main sites showing influence of Danubian culture in northern Italy and those with painted pottery of Balkan type in southern Italy; the arrows indicate diffusion of painted pottery towards northern Italy and Sicily

not reach Sicily where the older culture of Stentinello continued to live and develop.

Still a multitude of elements, foreign to the old Sicilian cultures, reached Sicily as a result of cultural and commercial relations with regions where the

new culture had developed. We have already mentioned the fortified villages of Stentinello, Matrensa and Magara Hyblaea which bear a striking resemblance to the villages in the Matera district like Murgecchia, Tirlecchia, Serra d' Alto, Murgia Timone, etc. At Stentinello we find idols and models of animals which may be connected with this Balkan horizon. Above all we find painted pottery evidently the result of importation. I mean pottery called after Megara Hyblaea, the station which yielded the most numerous and most perfect specimens to Orsi. They are mainly dishes with very simple decorations, generally "red flames" on a cream ground, sometimes with black outlines. The absolute identity existing between these vessels from Megara Hyblaea and those from the caves of Zinzulosa near Otranto in Apulia shows that we have to deal with a production common to eastern Sicily and the Adriatic coast of the Peninsula.

The succession of cultures in southern Italy has been admirably studied recently by Mr. Stevenson.[1] On his classification, which seems eminently plausible, the painted pottery of Megara Hyblaea type, apparently related rather to the Sesklo than to the Dimini class of Thessaly, would belong to the very beginning of the period of Balkan influence—his Period II. It would be followed by the indigenous polychrome pottery of Matera and by pottery, painted in red, and other wares of his Period III*a*. To the end of this evolution —Period III*b*—then, belongs the painted pottery "à tremolo sottile marginato" found at the Gravela Farm on Serra d' Alto with its developed forms and little elongated lugs, quite often unperforated.

In many sites of the Stentinello culture, including Stentinello itself and especially Matrensa and Trefontane, we meet sherds of these painted wares and above all of the red monochrome vases (Plate III, 1–2). These are certainly imports from the Matera district. But at the foot of Etna we have also sites where vases painted or covered with a lustrous red slip and provided with tubular handles are more numerous, whereas the impressed Stentinello ware is thereafter absent. Its place is taken by brown or grey undecorated ware. Its forms are quite similar to those of the evolved neolithic cultures of Apulia. Here belongs classically the site of Marmo di Paterno.[2] Since this site is quite close to the typical Stentinello stations of Trefontane, Poggio Rosso, etc., it must be admitted that these profound typological differences correspond to a chronological one. So, in a very advanced stage in the neolithic, the extremity of Sicily, closest to Italy, seems to have been absorbed into the area of expansion of the Apulo-Materan cultures. The same culture of the type represented at Marmo di Paterno reappears in the Aeolian Islands, on Lipari[3] and at

[1] Stevenson, R. B. K., "The Neolithic Cultures of South-East Italy," *Proceedings of the Prehist. Society*, 1947, pp. 85–100.

[2] Cafici, I., *Bull. Paletn. It.*, II, 1938, pp. 2–28.

[3] Orsi, P., "Miscellanea Sicula," VII, *Bull. Paletn. It.*, XLVIII, 1928, p. 88.

Calcara in Panarea where there is not a trace of the impressed pottery of Stentinello. In the rest of Sicily where Apulo-Materan wares do arrive, perhaps merely as imports, they appear still in a typical Stentinello context. Nevertheless this Apulo-Materan expansion probably marks the end of the Stentinello culture.

The next period is defined by the culture of San Cono-Piano Notaro, termed also Iozzian after Predio Iozza near Gela.[1] Pottery characteristics of this culture (Plate III, 3) has been found almost everywhere in Sicily—at Trefontane in the foothills of Etna, in the Grotto of Calafarina near Pachino, at San Cono near Licodia Eubea, at St. Ippolito di Caltagirone, at Piano Notaro near Gela, in the Grotte Zubbia of Palma Montechiaro, at Naro and Agrigentum; it is particularly abundant in the Palermo region. The San Cono culture is characterised by pottery quite different from that of Stentinello. It is still decorated before firing, but in a quite individual style; the ornamentation is composed of incised lines often bordered by punctuations and interrupted by little dimple-like impressions. Sometimes traces of colour may be observed thereon—stripes painted in red ochre on the brown clay ground. Such painted pottery certainly lacks the beauty of the Materan ware in the Balkan tradition that had been imported in the Stentinello period, but perhaps it represents the first attempts at a local painted ware. It may be recalled that a quite similar decoration of red stripes on a brown ground combined with the incised technique exists also in Spain on sherds from los Murcielagos and other caves in the south. In the San Cono culture we meet for the first time in Sicily arrowheads, generally hollow-based and without tang, and also spindle whorls.

But at this very moment while the culture San Cono–Piano Notaro was flourishing in Sicily, an event occured which upset the whole course of the island's prehistory: Sicily was drawn into the area of expansion of Aegean cultures. With this Helladic influence must be connected three independent cultures—those of Serraferlicchio, S. Ippolito and Castelluccio. They certainly have a common origin since each exhibits a number of elements obviously derived from the Aegean. But the several Aegean traits are so divergent as to prove that the impact of these influences affected Sicily at different times.

The Castelluccio culture flourished in the south-eastern corner of the island; its principal centres lie in the environs of Syracuse roughly between the plain of Gela and Etna.[2] In general they are villages on the summit of an

[1] Orsi, P., *Bull. Paletn. It.*, XXXIV, 1908, pp. 119 and 155 (Gela, Piano Notaro); XXXIII, 1907, p. 8 (Calafarina); XLVIII, 1928, p. 82 (Bersaglio di Caltagirone).

Cafici, Ippolito, *Bull. Paletn. It.*, V., 1879, p. 33 and 65; XXV, 1899, p. 53 (S. Cono); *Rendiconti Lincei*, XXV, 1916, fac. 3.

Cafici, Corrado, *Bull. Paletn. It.*, XLV, 1925.

[2] Orsi, *Bull, Paletn. It.*, XV, 1889 (Siracusa, Predio Reale); XVII, 1891, p. 53 (Melilli); XVIII, 1892, pp. 1 and 64 and XIX, 1893, p. 30 (Castelluccio); XXIV, 1898,

isolated elevation with steep slopes or on a spur joined to the main mass by a narrow ridge. The sites accordingly are chosen generally with a view to defence. Representatives of this type are the villages of Castelluccio near Noto whence this civilisation gets its name, Bernardina near Mellili, those in the Comiso region, like Sante Croci, Branco Grande and, above all, Monte Sallia; the latter is the largest and most important, its prosperity being due to the exploitation of the flint mines at Monte Tabuto. At Branco Grande, on the contrary, located on the sea shore, natural means of defence were lacking, and so a genuine circular rampart of stone had to be built.

We know practically nothing about organisation of these villages. Nevertheless Orsi discovered traces of round huts on Branco Grande and Sante Croci, and a rectangular house at Settefarine. The cemetery occupies the steep slopes of the hill occupied by the village or the cliffs of an adjacent ravine. But the little clusters of tombs, sprinkled about almost everywhere in south-east Sicily, point to a very scattered population.

The tombs of the Castelluccio culture are always collective; they are small, round chambers cut in the rock with a rounded vault recalling regular furnaces. Their diameters vary on an average from 5 to 12 feet. The chamber is reached through a little rectangular opening and is often preceded by a small ante-chamber of oval form which debouches externally on an open forecourt, more or less semi-circular. The entrance is generally closed by a wall of stones and sometimes by a slab. At Castelluccio several of these slabs are decorated with spiral motives in relief. These tombs are normally grouped in small cemeteries. In the collective tombs the corpses are lying in the contracted position. The same tomb frequently contains the remains of several dozen individuals.

The Castelluccio culture is characterised by pottery, painted in brown or dull black on a yellow or reddish ground. The technique of decoration, the patterns and even the forms disclose evident kinship with Helladic matt-painted ware. The repertoire consists of a very limited number of shapes constantly repeated. We have large amphorae, bowls on a high conical foot normally provided with three ribbon handles, and hour glass mugs with one or, more commonly two, handles. The decoration displays an equal uniformity. The fundamental motif, more or less elaborated, is always formed by inter-

p. 167 (Monte Tabuto); XXVII, 1901, p. 153 (Gela et Manfria); XXVIII, 1902, p. 103 (Valsavoia); *id.*, p. 184; (Cava Cana Barbara); XXIX, 1903, p. 23 (Rivetazzo); XXXIII, 1907, p. 53 (Catania Barriera); XXXVI, 1910, p. 158 (Branco Grande et Settefarine); XLIII, 1923, p. 3 (M. Sallia); XLVI, 1926, p. 5 (Sante Croci); XLVIII, 1928, p. 44 (Palma Montechiaro, M. Casale, M. San Basile, Bersaglio di Caltagirone); L–LI, 1930–31, p. 134 (Biancavilla); *Archivio Storico Siciliano*, 1893 (Melilli); *Ausonia*, 1906 (Cava Lazzaro, Cava d'Ispica, etc.).

secting ribbons. Both shapes and designs have general analogues in Middle Helladic Greece. But more striking parallels are to be found in Anatolia (at Boghaz Keui and Alişar III), in which direction point also the celebrated bossed bone plaques, now assigned by Schaeffer to Troy III, and the clay horns which appear in almost every station of the Castelluccio type.

The Castellucio tombs usually contain many fine blades of flint, very regularly worked, beads of stone, bone and shell, and often some metal objects. The latter include copper beads, a few daggers of a very archaic type and some very thin fragments of sheet copper that Orsi interpreted as razors. But in the villages the greater part of the stone industry is of the pseudo-Campignian type worked on both faces. In fact, it is to this period that we must attribute for the most part the huge surface "Campignian" sites of the Iblean Mountains (San Cono, Rubalà, Fiumegrande, Alia, Amerillo, Lavandaio, Scalona, Calaforno) explored by Ippolito Cafici.[1]

The Castelluccio culture is thus characterised by a decorative style, monotonous and self-consistent that leaves little room for the imagination. On the contrary the Serraferlicchio culture in this respect looks quite different.

The village of Serraferlicchio (Agrigentum),[2] the refuse from which was found piled up in a sort of huge fault or fissure in the hill, also possessed pottery painted with black patterns on a red or yellow ground. But the shapes as well as the patterns of this pottery (Plate IV, 1) are quite different from those of Castelluccio and are far more varied. Most shapes are closely similar to the native vases of the San Cono culture. There occurs too in the uppermost layers of the deposit at Serraferlicchio and on analogous sites a fabric painted in three colours, white and brownish-black on a red or yellow ground, or red, outlined in black on a white ground. Finally, with the painted pottery exist a red monochrome ware and a buccheroid ware, blackish or grey (Fig. 5).

Many common traits, notably monochrome red and rough pottery, the distinctive shapes of which are common to both, connect Serraferlicchio with the station of S. Ippolito in Caltagirone[3]. Here the painted pottery, however, on the whole exhibits individual peculiarities. The shapes of the painted vases are rather monotonous, the commonest being a globular cup with a wide cylindrical neck and large vertical handle, and a bowl on a high conical foot. There are also some curious rectangular troughs with a hemispherical bowl on

[1] Cafici, Ippolito, *Bull. Paletn. It.*, IV, 1878, p. 39 (Calaforno); V, 1879, p. 33 (San Cono); XLI, 1915, p. 133 (Calaforno); XLIV, 1924, p. 35; XLIII, 1923, p. 3 (M. Sallia); XLVI, 1926, p. 108 (Scalona); XLVIII, 1928, p. 99 (Amerillo et Lavandaio); L–LI, 1930–31, p. 26 (Calaforno); LIII, 1934, p. 29; *Atti R. Accademia Scienze Lettere e Belle Arti di Palermo*, XIV, 1926 (Bersaglio di Caltagirone).

[2] Arias, op. cit.; Orsi, *Bull. Paletn. It.*, XLVIII, 1928, p. 64.

[3] Orsi, "Miscellanea Sicula," *Bull. Paletn. It.*, 1928, p. 82.

the rim at one end. The decoration, painted in dark colour on a yellowish ground, is very simple, and, indeed, generally confined to a horizontal line at the base of the neck, from which hang at intervals two or three groups of pendant lines, while the neck itself may be painted with points, groups of arcs, or dog's teeth. Up to now we have no stratigraphical evidence for the chronological relation between Serraferlicchio and S. Ippolito, but on typological grounds it can be argued that the former at least began earlier. In any case, both are older than the Castelluccio culture, for their distinctive types are

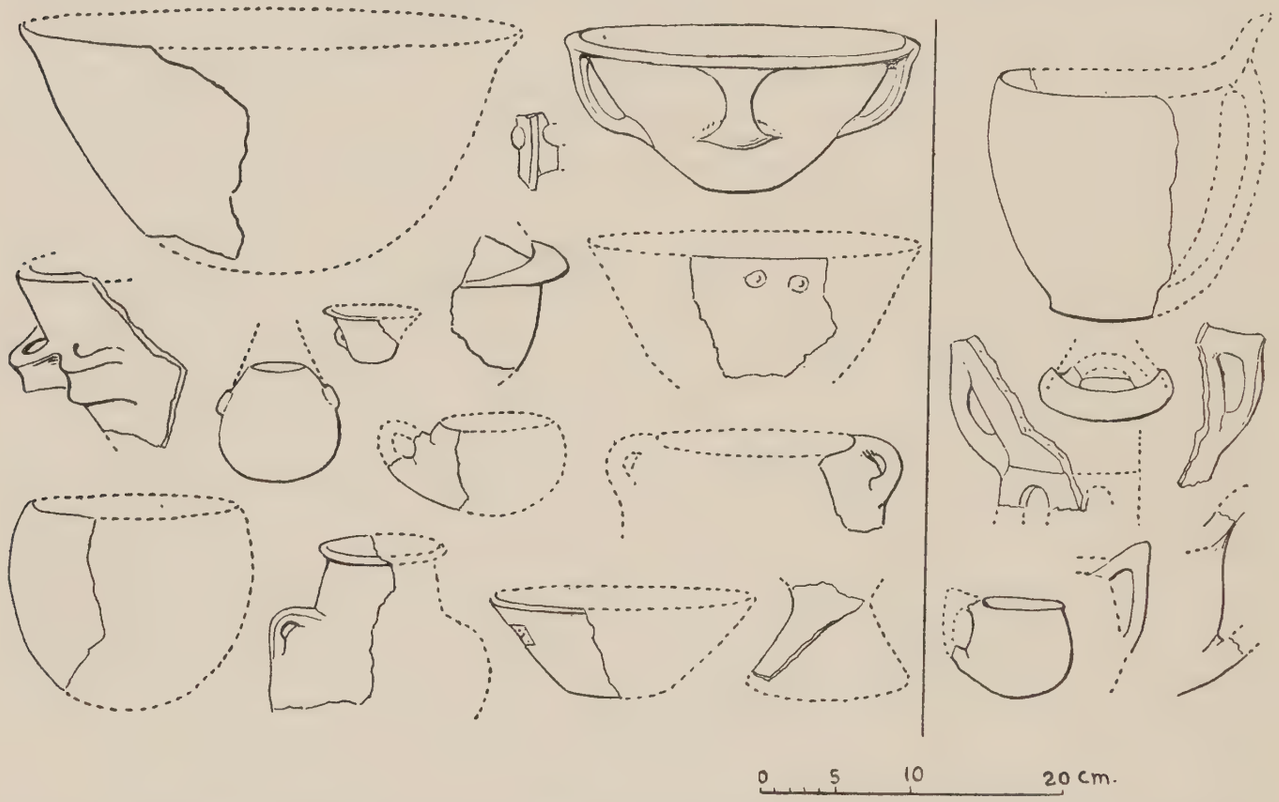


FIG. 5. Types of plain pottery from Serraferlicchio (left, buccheroid; right, red monochrome)

never found associated with typical Castelluccio pottery, but often with Neolithic wares of the Stentinello, Marmo and (more frequently) S. Cono types. Conversely, Castelluccio ware is never found with Neolithic pottery but does occur with late bronze age wares of Thapsos type. Still the culture of S. Ippolito, although chronologically distinct from and anterior to Castelluccio, is derived, like the latter, from Aegean-Anatolian prototypes. The globular cup with cylindrical neck can be best paralleled in Troy III-V, as can a jug with pointed base and cut-away neck, while a bridge-spouted bowl recalls rather the Middle Minoan form.

No trace of such Anatolian influences can be detected in the culture of Serraferlicchio. Its painted pottery is to be compared rather with that of

Neolithic sites in Greece, specially, perhaps, Western Greece (e.g. the cave of Haghios Nikolaos near Astakos in Acarnania).[1]

How should we interpret the appearance of these new cultures in Sicilian prehistory? Everything leads us to suppose that it is a case of a genuine movement of colonisation, preceding at a distance of more than a millennium the very similar phenomenon of the Greek colonisation. The very close analogies connecting Castelluccio and Serraferlicchio with Aegean cultures with complete isolation from the cultures which preceded them in the island seem in fact to confirm this hypothesis. So we have a case of Aegean colonisation which would have affected the south and east coasts of the island—precisely those where later the Greek colonisation succeeded.

But in historical times the Greek colonists did not overrun the whole of Sicily. Side by side with the Greek colonies on the coast, the native cultures of the Siculi and Sicani continued to expand. Similarly the native culture of San Cono–Piano Notaro did not vanish, but retreated before the expansion of the new cultures of Aegean type and at the same time was more or less deeply influenced by them. That is how we must explain the appearance in the San Cono culture of many elements evidently derived from the Aegean, such as chambered tombs and pit-caves which are extremely numerous in the Conca d'Oro but which recur even at San Cono near Caltagirone. The presence in the pottery of Conca d'Oro of vase forms and types of handles evidently derived from S. Ippolito is to be explained in the same way. And so too must be explained above all the regular association on domestic sites and even in the tombs of native wares of San Cono type and painted vases of the Serraferlicchio class.

In this period the old native culture of San Cono-Piano Notaro type found a new and belated revival in the Palermo region in the culture of Conca d'Oro type recently described by Madame Marconi Bovio. It is at this moment and in the Province of Palermo that the bell-beaker appears in Sicily. Several specimens of bell-beakers have been found in the island, but all come from the north-west province. To the well-known example from the Villafrati are to be added two from Carini, one from Torrebigini[2] near Selinus and some fragments from Termini Imerese. These bell-beakers, evidently imports, disclose commercial and cultural relations with Spain, relations for which we find abundant evidence on the soil of Spain itself in pit-cave and chamber tombs peculiarly like those of the Conca d'Oro, in the red-on-brown painted ware of La Cueva de los Murcielagos, and even in the vases painted in brown or red

[1] S. Benton, "Haghios Nikolaos near Astakos in Acarnania," *B.S.A.*, XLII, 1947, p. 156.

[2] Mingazzini, "Due tombe sicule in territorio di Partanna," in *Studi d'Archeologia e d'Arte editi dalla Soc. Paolo Orsi*, I, 1939, p. 47.

on a pale ground from Los Millares. Just as later on in Classical times Sicily was to be called to play the reading role in the hellenisation of the far west, so in prehistoric times Sicily must already have fulfilled the function of relay station for the diffusion of eastern influences to the coasts of Iberia.

Under the influence of the bell-beaker there developed in the north-west of Sicily, i.e. in the natal area of the culture of Conca d'Oro, a new class of

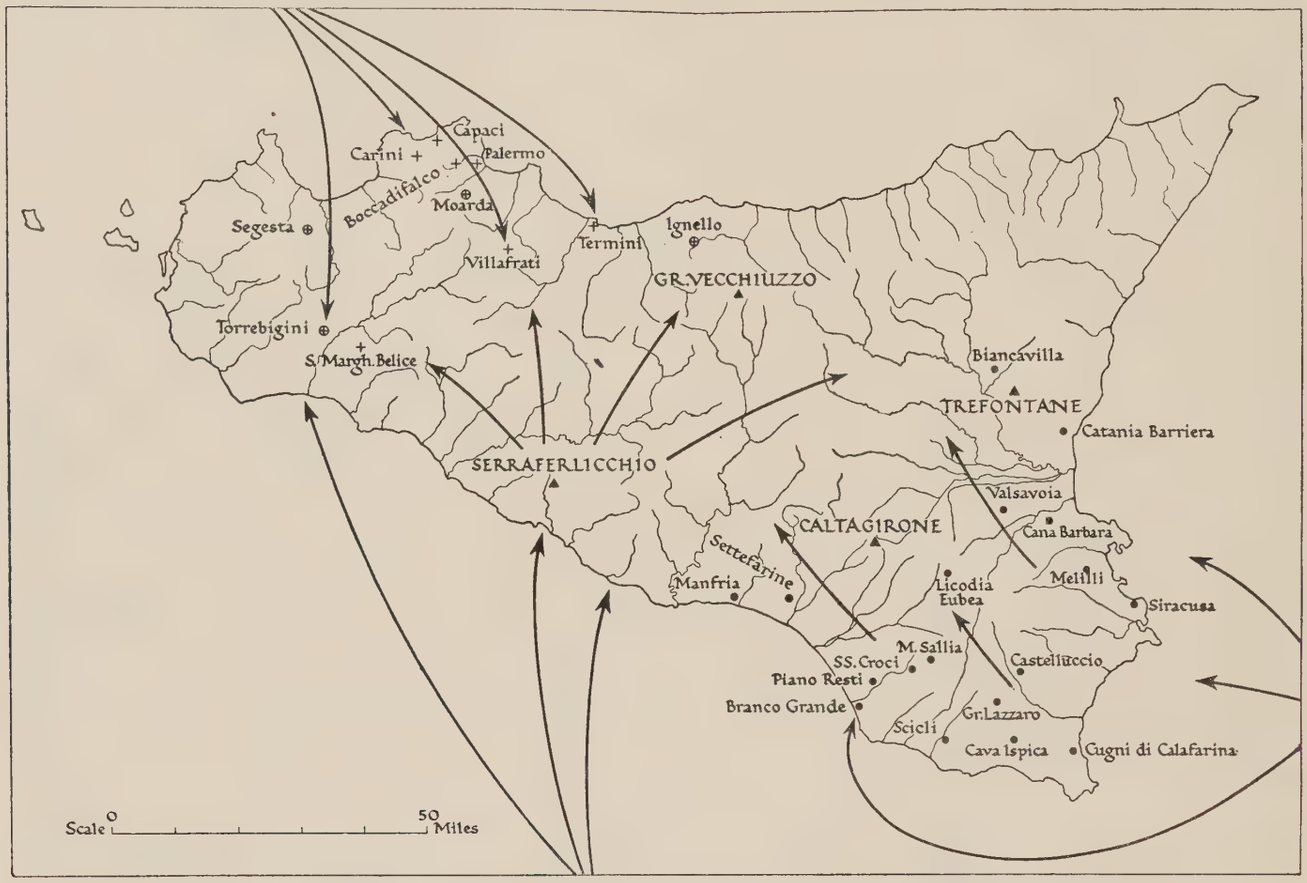


FIG. 6. Sicily in the age of Castelluccio and Serraferlicchio.
Circle—site of Castelluccio type
Triangle—site of Serraferlicchio type
Cross—site of S. Cono-Conca d'Oro type
Cross in circle—site yielding pottery in the style of Moarda-Torrebigini
The arrows show the Helladic influence on the south and east and the importation of Bell-beakers from the north-west

pottery decorated by incised parallel ribbons[1] which is quite often associated both in tombs and domestic sites with the typical Conca d'Oro ware, and even with painted ware of Serraferlicchio. This is the group of Isnello, Moarda and Torrebigini (Plate IV, 2).

Accordingly during this period three cultures—Serraferlicchio, S. Ippolito and Conca d'Oro—were flourishing side by side in Sicily and were influencing one another (Fig. 6). These are ultimately overlaid by the Castelluccio culture

[1] Marconi Bovio, "La cultura tipo Conca d'Oro," l.c.

which established a firm footing even in the district of Agrigentum where the culture of Serraferlicchio had previously flourished. But its expression in this region exhibits some rather peculiar features; above all the decorative style differed materially from that of Castelluccio itself. The result is the culture of Monte d'Oro, Monte Sara and Monte Aperto.[1]

But the westward expansion continued. At Vallelunga between Caltanissetta and Palermo a very richly furnished tomb was found. It contained great bowls on a high foot (Plate V, 1), obviously derived from the Castellucchio type but bearing trichrome decoration like the most developed pottery of Serraferlicchio, together with goblets with handles rising above the rim in monochrome grey ware, indicating that we have by now reached an advanced phase of the Bronze Age. At the same moment perhaps, while the painted pottery of Castelluccio was proceeding to develop on territories even further to the west, another culture had already appeared in the eastern part of the island on the coast near Syracuse. This is the culture illustrated by the great cemeteries of Matrensa, Cozzo del Pantano, Plemmirio, Molinello d'Agusta and Thapsos.[2] Here we still find chambered tombs of a type analogous to those of Castelluccio, but often of larger size including genuine tholoi. Painted pottery has vanished and has been replaced by a grey ware ornamented with strips in relief or with channelled grooves (Plate VI), but associated with vases, swords, beads, ivories and even gold rings imported from Mycenaean Greece. Among the Mycenaean vases (Plate V, 2), the oldest belong perhaps to the beginning of the fourteenth century.

A study of the cultures of Sicily during the Ultimate Bronze Age and the First Iron Age would take us too far—far beyond the limits laid down for the present study.

[1] Orsi, *Bull. Paletn. It.*, XXI, 1895, p. 80 (M. Sara); XXIII, 1897, p. 1 (Montedoro, Monte Aperto, Caldare). Mosso, *Monum. Antichi Lincei*, XVIII, 1908 (Caldare and Cannatello). De Gregorio, A., *Iconografia delle collez. preistoriche della Sicilia*, Palermo, 1917 (Partanna, Naro, Montedoro).

[2] Orsi, P., *Bull. Paletn. It.*, XVIII, p. 115 (Plemmyrion); XV, 1889, p. 203 and XXIX 1903, p. 136 (Matrensa); *Monum. Antichi Lincei*, II, 1893 (Cozzo del Pantano); VI, 1895 (Thapsos); IX, 1899, (Pantalica e Cassibile); XXI, 1913 (Pantalica et Dessueri); *Archivio Storico Siciliano*, 1893 (Molinello). Levi, D., "Traccie della civita micenea in Sicilia," in "Paoloo Orsi" (*Archivio Storico per Calabria e la Lucania*, 1935), p. 90. Arias, P. E., "Vestigia dell'arte egeo-micenea in Sicilia," *Bull. Paletn. It.*, I, 1936–07, pp. 57–64.

An Acheulian Implement from Slindon

By Edward Pyddoke

In 1947 the flint implement figured here was found in Penfold's Pit, near Slindon, Sussex. It seems to be of Middle Acheulian facies: it agrees very well with tools from Barnfield Pit, Swanscombe, Kent, which have been called Acheulian III.[1] For further description it suffices merely to add that the implement is entirely unabraded—the edges and *arêtes* being sharp and fresh. It has suffered no effects from temperature changes and is but lightly patinated, the lower side (the side shown in the drawing) to a clean white, the upper also white, but stained to a rather uneven lemon yellow. There seems to be little doubt that this difference in coloration between the two sides of the implement results from it having lain in the position in which it was found, namely directly upon the surface of a bed of clean marine sand, which, in the pit, is covered by a deposit of several feet of angular flint rubble in a ferruginous loamy matrix. This latter deposit is deeply weathered to a podsol whose "B" horizon oftens extends into the sand below, and the staining of the upper side of the implement is in all probability the result of its contact with this horizon.

The sands, which at Waterbeach, not far distant, contain a warm fauna, are those of the "One Hundred Foot" Raised Beach, which has been discussed by Oakley and Curwen,[2] Fowler,[3] Calkin,[4] Zeuner[5] and others. They are clearly marine in origin. The overlying deposit has been called "Coombe Rock" or the product of solifluxion or "pseudo-solifluxion." The writer, however, prefers in this case the somewhat vague name of "Head," a term whose reintroduction has been recommended.[6]

The implement figured appears to be the only recorded one from Penfold's Pit—Fowler's Pit No. 8—though others have come from nearby pits similarly associated with raised beach deposits.

[1] "Report on the Swanscombe Skull," *J.R.A.I.*, LXVIII, 1938, pp. 17–98.

[2] Oakley, K. P., and Curwen, E. C., "The Relation of the Coombe Rock to the 135 ft. Raised Beach at Slindon, Sussex," *P.G.A.*, XLVIII, Pt. 4, 1937, pp. 317–23.

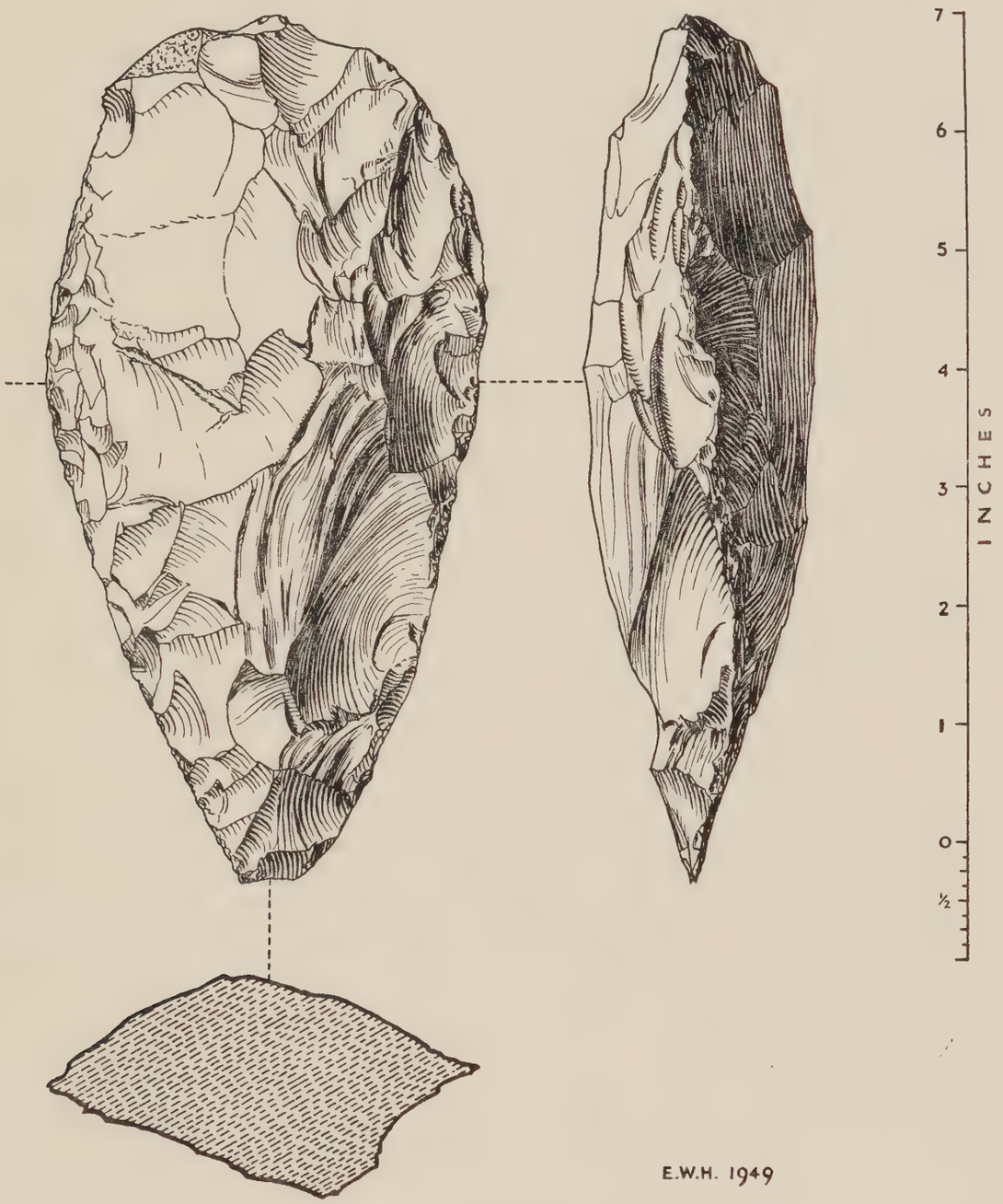
[3] Fowler, J., "The 'One-Hundred Foot' Raised Beach between Arundel and Chichester," *Q.J.G.S.*, LXXXVIII, 1932, pp. 84–99.

[4] Calkin, J. B., "Implements from the Higher Raised Beaches of Sussex," *P.P.S.E.A.*, Vol. VII, Pt. III, 1934, pp. 333–47.

[5] Zeuner, F. E., *Dating the Past*, 1946, p. 194.

[6] Dines, H. G., *et. al.* "The Mapping of Head Deposits," *Geol. Mag.*, LXXVII 1940, pp. 198–226.

Calkin has suggested that those of the Pleistocene marine beach deposits which occur in the neighbourhood at 80–90 ft. O.D., and contain implements identified by him as Clactonian I, antedate the higher beach deposits, which



Hand-axe from Slindon.

include those at Penfold's Pit and which extend up to 135 ft. O.D. Typologically, these artifacts are almost certainly older than the Acheulian of the higher beach deposits, but it is for mechanical reasons difficult to assume that a sea, first advancing and then receding, should leave intact earlier deposits

at a lower level than the shore line of its maximum advance. From the point of view of beach formation, the 80–90 ft. deposits are most likely to be recessional deposits of the Tyrrhenian sea. This is corroborated by Calkin's observation that "all the specimens are rolled, some heavily and a few are deeply striated." Hence they may well be derived from some earlier deposit.

In relating the Slindon beaches to the Tyrrhenian sea of the Great Interglacial the interdigitation of the upper portion of the sands with the lower part of the overlying "Head," observed by Oakley and Curwen, is most easily interpreted as the result of cliff falls (Zeuner). In fact, a wave-spread cliff-fall may be indistinguishable in the field from a deposit of the "Head" type which is generally regarded as the product of a periglacial climatic phase. Whilst the sheet of Head which is spread over the marine gravels and sands of the area is indeed likely to be the product of cold conditions, namely of the Penultimate and Last Glaciations, when the sea-level was low, it is difficult to believe that cold solifluxion had already begun when the sea-level was high and the climate temperate.

Somewhat similar interstratification of the beach, cliff-falls and "Elephant Bed" deposits is to be seen at the Black Rock cliff section at Brighton.

With regard to the past existence in the Slindon area of a cliff to produce such cliff-falls, field evidence is not conclusive. Clement Reid[1] reported some traces, but other workers—including Fowler—were unable to find any. However, since the area has been subjected to periglacial conditions at least three times, and since one must assume large-scale denudation to account for the production of the considerable thickness of the Head, which has an average depth of about 10 ft., it is certain that enormous quantities of material have disappeared since the Tyrrhenian phase from the landward side of the fossil beach. Furthermore, in places, deep gullies (like Slindon Bottom) have been cut through the beach deposits and have developed headwaters on the landward side of the beach. It is perfectly conceivable, therefore, that the fossil cliff has been completely swept away, and the configuration of the ground above the 135 ft. contour has entirely changed.

The sea-sands themselves attain in the district to a thickness of some 14 ft. and even in the higher levels are sometimes false-bedded. Their exact relationship to the contemporary sea-level is difficult to assess; they may equally well be a storm beach, an inter-tidal beach or an off-shore bar, and even contain some dune deposits in their upper levels.

For purposes of correlation one should properly work from the level of the rock-cut platform on which lie subsequent aggradation deposits. In the case of Penfold's Pit this platform is at about 98–100 ft. O.D., but there exist

[1] Reid, C., "The Pleistocene Deposits of the Sussex Coast, and their Equivalents in other Districts," *Q.J.G.S.*, XLVIII, 1892, pp. 344–61.

locally a whole series of platforms cut in the chalk, ranging from 70 ft. to 120 ft. O.D., and Bull[1] has identified two distinct and well-marked sets of erosion flats in the Arun Valley at 80 ft. and 130 ft. O.D., respectively.

On the other hand, at Swanscombe, where the water-laid deposits are those of the 100 ft. Terrace of the Thames, though the bench is at 75 ft. O.D., the *surface*-level of the upper loam at 110 ft. agrees almost exactly with the *surface*-level of the sand at Penfold's Pit.

Given these limits, the difficulties of presenting precise correlations are obvious, but the levels at Penfold's Pit are well within the range of values known of the Tyrrhenian sea and thus confirm a date for the sands in the Great Interglacial. From the condition of the implement, it would appear that it cannot have lain uncovered for any great length of time after it came to rest on the sands.

The implement has been added to the collections of the Institute of Archaeology. Mr. Eric Holden is to be thanked for the preparation of his excellent drawing.

[1] Bull, A. J., "Studies in the Geomorphology of the South Downs," *P.G.A.*, XLVII, Pt. 2, 1936, pp. 99–129.

Pleistocene and Holocene Sections in Deposits of the Lower Thames

By Ian W. Cornwall

(1) Bowman's Lodge Pit, Dartford Heath

The north end of this large and well-known pit in high-level gravels of the Thames is at the present time being worked with mechanical excavators. A considerable overburden of loam has to be stripped off before the gravel can be excavated. The stripping is done with some skill, so that the very surface of the gravel is laid bare with little disturbance.

At the surface of the gravel a considerable collection of flint implements has been made from a restricted area in the last few months by Mr. P. J. Tester of Bexleyheath, who has been keeping the work under observation. They are of Middle Acheulean, Clactonian and early Levallois types, and with them occur shells of oyster (*Ostrea edulis*). Mr. Tester insists that the industries occur on the surface of the gravel, and never in it; nor has any artifact been observed from the body of the overlying loam. This contrasts with the position of the similar industries from the neighbouring Wansunt Pit (now worked out), which occurred *in* the clayey filling of a channel cutting the gravel.[1]

The writer was consulted as to the geological relations of the finds. His thanks are due to Mr. Tester for visiting the site with him, for placing the results of his observations at the writer's disposal and for permitting him to publish this report on the results of the study of the geological section and of the samples collected therefrom.

The section seen was as follows:—

Sandy loam up to 14 ft., highest point about 120 ft. O.D.
Gravel up to 20 ft.
Thanet Sand (Tertiary) at 85 ft. O.D.

The lowest part of the gravel much resembles the Middle Gravels at Barnfield Pit, Swanscombe, being generally pale in colour with pebbles black-spotted with manganese. The greater part, however, is very red and iron-stained. It contains green-coated flints from the Basement Bed of the London Clay

[1] Chandler, R. H., and Leach, A. L., *Proc. Geol. Assoc.*, London, XXIII, 1912, p. 105.

and many glacial erratics. As at Swanscombe, many of the flints are reddened, as by fire, though it is not suggested that this reddening is due to human agency.

No fossils or artifacts have recently been found in the gravel, but rhinoceros, mammoth and shells are recorded by Prestwich (*teste* Chandler and Leach, op. cit.) and these latter authors record a mammoth (?) leg-bone (their query) as having been found a few years before the date of their paper.

The loam covering the gravel is up to 14 ft. thick at its maximum, but seems to have been eroded away to the northward, on the slope of the present valley, where the gravel crops out beneath it at a lower level. From the map, the loam appears possibly to be an easterly extension of that filling the channel observed by Chandler and Leach, though the present section would, in this case, be about 45° oblique to its presumed course. The loam is evidently water-laid, bright red-brown in colour with bluish flecks and patches. In this respect it resembles a waterlogged meadow-soil, and indeed probably represents the waterlogged loam of an ancient flood-plain. On the other hand, the silt of a tidal marsh may present similar patches of chemical reduction of the iron compounds and this is a possible alternative, especially in view of the presence of marine shells below it.

A sample of the loam was taken and examined in the laboratory. The sand content is well-rounded and very fine in grade—not more than 5 per cent coarser than 0·5 mm. The sand is bleached and clean. The reaction of the sample was neutral to slightly acid and there was no undecomposed calcium carbonate—and, therefore, no shells or Foraminifera which might have settled its mode of formation. There was no trace of an ancient soil or of bleaching of the underlying gravel at the junction with the loam. This negative evidence suggests that the two deposits were laid down without any considerable intervening pause or prolonged exposure to chemical weathering. The hand-axe and flake industries, some with facetted butts, which occur at this level would, therefore, be strictly contemporary with one another and represent an almost instantaneous sample of the human cultures at the time.

The white patination of many of the artifacts makes it likely that their surroundings had, at one time, been alkaline, containing calcium carbonate in the form of chalk, shells, etc. Only the relatively massive oyster-shells have survived the slightly acid conditions obtaining to-day. In the absence of any other organic remains, they suggest food-débris of the makers of the implements. This species is not content with merely brackish or estuarine conditions, so that its occurrence involves the presence of salt water at no very great distance One may, perhaps, admit that they have been transported for a few miles by man, so that salt water need not have extended as far up the estuary as Dartford.

The geological evidence is not altogether conclusive as to the dating of the horizon at which the artifacts occur. That at least part of the Dartford

Heath gravel is older than the Barnfield aggradation is suggested by the summit of the gravel at 136 ft. O.D., while at Barnfield Pit the top of the fluviatile deposits reaches only 110 ft. O.D. The resulting gradient of more than 5 ft. per mile is far too steep for the Thames at this stage, in view of the other available evidence.

Hinton and Kennard[1] regarded these gravels as a fragment of an ancient terrace, higher than the Boyn Hill, of which the Kingston Hill gravels (187 ft. O.D. max.) and those of Wimbledon Common (180 ft. max.) possibly formed upstream portions.

Chandler and Leach, on the other hand (op. cit., p. 104), considered them to belong to a later stage of the Middle Barnfield (Swanscombe) aggradation, mistakenly supposing the bench at Swanscombe to be generally as high as 90–100 ft.

Zeuner[2] suggests that both these views would be correct if the Dartford Heath gravels are really composite, consisting of one deposit lying on an extension of what he terms the Kingston Leaf bench at about 100 ft. O.D. and another element lying on a lower bench at about 80 ft. O.D., equatable by a reasonable gradient with that at Swanscombe (75 ft. O.D.)[3]. He confirms verbally to the writer that he observed a bench-level of 87 ft. O.D. in the Wansunt Pit in 1939.

Now the base of the gravel at Bowman's Lodge Pit lies, according to Mr. Tester's measurements, as low as 85 ft. O.D. This would give a gradient of just under 2 ft. per mile to link up with the lower bench at Barnfield Pit. It is not necessarily a minimum height.

Chandler and Leach give the bench-levels observed by them at the Wansunt Pit as between 90 and 100 ft. O.D., so that this part of the gravel could lie on the buried valley-slope leading up to the Kingston Leaf bench, or even on the bench itself. At our site the bench is plainly too low for this and is, therefore, probably that of the marginal part of the Boyn Hill terrace. The possible mutual relations of the two benches and series of deposits are shown in Fig. 1. The present evidence seems to support this conclusion; indeed the industries would readily fall into place as representing a slightly later typological phase than Swanscombe, with early Levalloisian accompanying Middle Acheulean.

If, however, we make the Dartford Heath gravels due to an earlier aggradation than the Middle Barnfield stage at Swanscombe, there are only two alternatives: either the artifacts are also much earlier than those of the Middle Gravel at Swanscombe, or if (as appears likely on typological grounds) they are slightly later, the surface of the gravels must, in their time, still have been

[1] Hinton, M. A. C., and Kennard, A. S., *Proc. Geol. Assoc.*, London, 1905, XIX, p. 80.
[2] Zeuner, F. E., *The Pleistocene Period*, London, 1945. (p. 120 and footnote).
[3] Report of the Swanscombe Committee, 1938, *J. R. Anthr. Inst.*, LXVIII, p. 17.

bare to receive them, i.e. there is a long gap between the deposition of the gravel and that of the loam.

The field evidence does not support this view. The loam appears to be a very typical flood-loam, whether of the river flood-plain or of a tidal marsh cannot, in the absence of fossils, be decided. Evidence for any long exposure of the surface of the gravels is lacking. It is much simpler, therefore, to hold that part at least of the Dartford Heath gravels represents a concluding phase of the Middle Barnfield aggradation, thus avoiding both geological and archaeological difficulties.

If this dating is not at fault, an interesting archaeological conclusion emerges from the argument—namely, that a true, if early, Levalloisian industry developed (possibly out of Clactonian) alongside a Middle Acheulean late in the Great Interglacial (= Mindel-Riss).

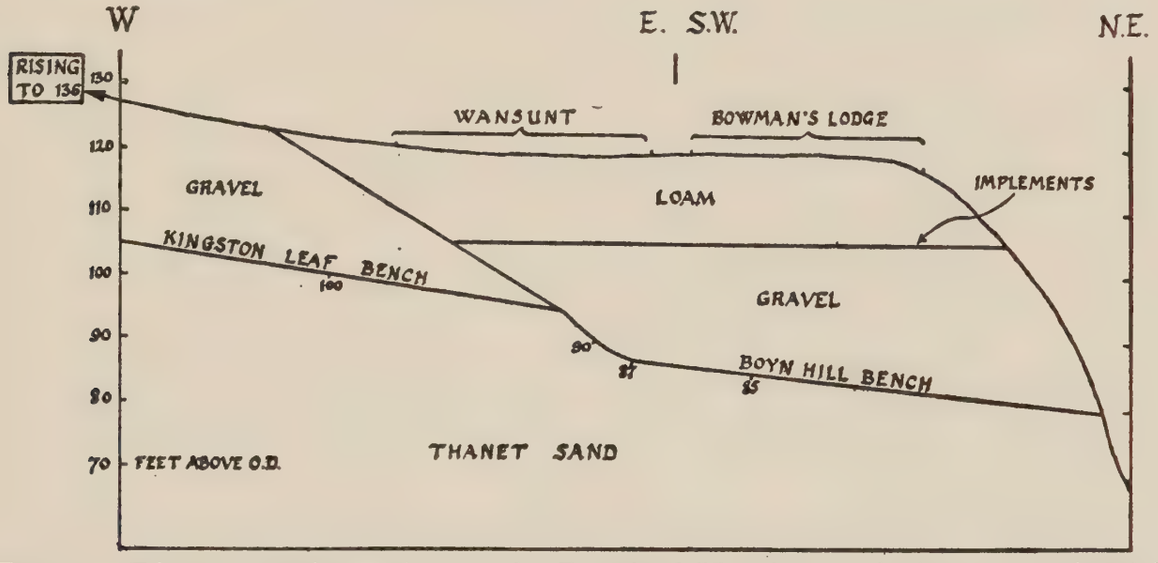


FIG. 1.—Diagrammatic section at the Dartford Heath gravel pits, approximately at right-angles to the course of the Thames at Dartford Marshes, to show a possible interpretation of the benches and deposits as belonging to two distinct periods.

Traces of an incipient Levallois technique have been discerned in flakes from the Middle Gravels at Swanscombe (S. Hazzledine Warren in the Swanscombe Report[1]). But little later, in terms of geological time, and before the end of the same interglacial period, an unmistakeable Levalloisian with facetted butts begins to appear. This confirms the general conclusion of Zeuner[2] from the evidence hitherto available that "the appearance of the Levalloisian technique in (probably the latter part of) the Penultimate Interglacial is to bepresumed."

(2) East Greenwich, Sections in a Buried Channel of the Thames

During recent excavation work for a new river-water intake by the South Metropolitan Gas Co. at their East Greenwich works, a circular pit some 40 ft.

[1] *loc. cit.*, p. 17.

[2] Zeuner, F. E., *Dating the Past*, London, 1946, pp. 286–7.

in diameter and of the same depth was opened in later alluvia of the Thames flood-plain.

The writer was invited by Mr. C. H. Brett, of the Company's Accounts Department, to visit the site.

When seen, the excavation was nearly complete, but the sides having been progressively revetted with interlocking steel piling and reinforced at 10 ft. intervals with annular ribs of concrete the section had at no time been entirely exposed. The floor of the pit was of medium-sized, greyish, sandy gravel, full of water, with a sump from which the inflow was being continuously pumped.

By the courtesy of the engineer in charge, the writer was enabled to examine a scale drawing of the section, as recorded in a typical trial boring before work was begun (Borehole No. 47). This section was as follows:—

Surface at + 18 ft. N.D. (+ 17 ft. O.D.)	
Made ground	6 ft.
Soft grey clay ("river-mud")	15 ft.
Peat	6 ft.
Grey sandy clay (flood-loam)	4 ft.
Sandy ballast (gravel)	21 ft.
Blue clay (London Clay)	19 ft.
Woolwich and Reading Beds	11 ft.
Chalk at —63 ft. O.D.	

The Woolwich and Reading Beds and the London Clay are marine deposits of Eocene age and represent the pre-existing "solid" into which the Thames cut its channel, during a period of low sea-level, to a depth of —33 ft. O.D. The succeeding fluviatile deposits, of continuously decreasing particle-size, represent progressive stages in a period of aggradation due to a sea-level rising with reference to the land. Under these conditions the current gradually slowed, so that at first coarse, and later even the finest, sediments were deposited in succession. There follows a thick bed of peat, showing that vegetation grew and decayed for a considerable period on the marshy surface of the flood-plain thus constructed by the river. This denotes a pause in the submergence, but the peat is succeeded by the thick deposit of "river mud." This deposit was regarded by the engineer as possibly having been dredged, over a period of many years, from the present channel of the river and dumped on the landward side of the retaining wall of the bank. However, a similar "mud," though often not as thick as this bed, is a constant feature of bore-sections on other parts of the gasworks property, often a good distance from the present course of the river, so that the probabilities are in favour of its natural formation, at least in part. In this case it would indicate a slight re-submergence since the growth of the peat.

Unfortunately, since the succession could not be examined *in situ*, there was no possibility of finding human artifacts. The gravel-dump from the bottom of the pit was searched in vain for these, or for animal bones which might have yielded climatic evidence in support of the geological conclusions. The only fossil which had been recognised by the workmen was a, probably drifted, tree-stool from the grey sandy clay just below the peat. Sections of wood from this have been indentified by Mrs. F. L. Balfour Browne as almost certainly alder.

The South Metropolitan Gas Company, through Mr. Brett, very kindly supplied a print from an original plan of the gasworks property, showing the exact locations, and provided with scale drawings of the sections, of more than fifty exploratory borings made during and since the war. It was hoped that these would enable the sub-surface contours of the Tertiary "solid" to be mapped and so to delineate the course of the buried channel exposed in the excavation.

Some of the boreholes, made, in most cases, to discover a firm stratum for the driving of foundation-piles, did not penetrate the ballast-gravel, having served their purpose by showing its surface-level and the presence of a sufficient thickness for supporting the piles. Happily, about two-thirds of the whole number did reach the base of the fluviatile deposits and, from the figures thus obtained, a skeleton map of the surface of the Tertiary deposits was constructed (Fig. 2). The grouping of the borings left a good deal to be desired, for the purposes of this mapping, and there remain considerable blank spaces.

The 33 borings penetrating to this surface fell mainly into four areas, respectively yielding values for the depths below O.D. of the "solid" as follows:

Area No.	*No. of Values*	*Extremes*	*Arithmetic Mean*
1	4	33 ft. — 36 ft.	35 ft.
2	12	29 ft. — 37 ft.	33 ft.
3	4	23 ft. — 29 ft.	25·5 ft.
4	10	22 ft. — 28 ft.	25 ft.

The mean values of these four groups indicate two well-defined benches in the sunk channel, one at about —25 ft. O.D. and another near —33 ft. O.D.

Three individually isolated values in the more northern part of the site ranged from 38 ft. to 44 ft., with a mean of 41 ft. These do not consort well with the other groups, either in magnitude or in location in the horizontal plane, and their significance is not clear. They may be due to deep eddy-pools in the river-bed.

Whitaker[1] records a boring at Greenwich Marshes (his No. 15) in which

[1] Whitaker, W., "Geology of London," *Mem. Geol. Survey England*, Vol. II, 1889, pp. 273–4.

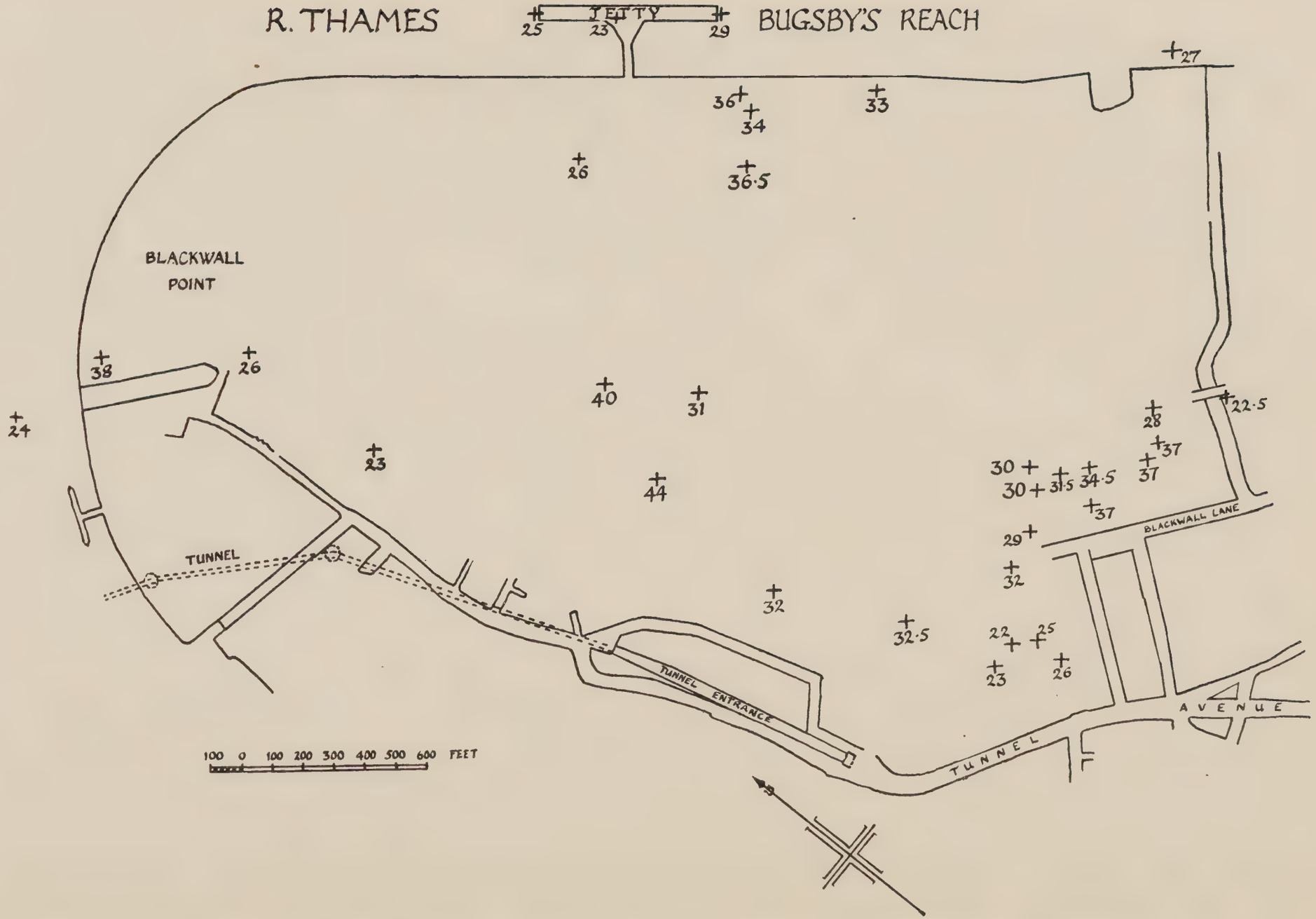


FIG. 2.—Plot of boreholes on the gasworks property. Figures represent levels, in feet below O.D., of the surface of the Tertiary "solid."

the base of the gravels lies at 26·5 ft. below O.D., well within the range of variation of the levels of the bench at 25 ft. Another (his No 18) "? one-third of a mile S.E. of Blackwall Point" is clearly on our site and probably lies near Area 1 in the above table and in the blank area between it and Area 2. The base of the gravel resting on blue clay is given as 33·12 ft. below O.D., a figure which falls within the range of the low bench levels in the buried channel. This boring provides further evidence for the course of the channel here suggested.

The new interest of these results lies, not so much in the recognition of the two benches,[1] as in the evidence they yield for the direction at this point of the sunk channel. Areas 1 and 2, giving the values for the lower bench, lie, respectively, at the north-east and south-west extremes of the gasworks property and probably define the course of the sunk channel as following a line in this direction. Unfortunately there are no intermediate boreholes on the line, which would prove or disprove this conclusion, save Whitaker's somewhat vaguely located example.

The areas giving the bench at —25 ft. O.D. lie mainly to the north-west of the line of deepest soundings, but two bores to the south-east of Area 2 suggest its presence on this side of the deep channel also. Thus the deep channel seems to cut clean across the base of the present great northward meander of the Thames at Blackwall Point, showing that the meander has developed, or shifted downstream, to this locality, since the cutting of the channel. Flanking the channel itself is a "flat" of considerable extent, due to a phase of erosion quite distinct from that which cut the deepest channel.

The floor of the buried channel, eroded by an active current when the river-mouth, in a period of low sea-level, was far seaward of its present position, has a noticeable gradient.

Whitaker[2] details eleven sections from borings in the Tilbury Docks area, 16 miles downstream as the crow flies. In ten of these the mean level of the floor of the channel is —54 ft. O.D. (extremes: —43·5 ft. and — 62 ft. O.D.). This would correspond with the —33 ft. O.D. level at East Greenwich, the difference of 21 ft. giving a gradient of 1·3 ft. per mile.

A single value at Tilbury of —33 ft. O.D. suggests the shallower "flat" distinguished at East Greenwich, and there averaging —25 ft. O.D. The difference here of 18 ft. gives a gradient of 1·1 ft. per mile between the two places.

[1] Professor Zeuner, in conversation with the writer, confirms that these levels at East Greenwich fall well into place among many other values defining the two lowest benches of the buried channel of the Thames, recognised by Day Kimball and himself in a forthcoming work on the longitudinal profile of this river.

[2] Whitaker, W., ibid., pp. 286–8.

An interesting feature of these Tilbury sections is the very variable number of peat-beds occurring at different levels in them. The two most constant of these have surfaces averaging −3·4 ft. O.D. and −23 ft. O.D. They are represented by seven and eleven values respectively. Two, three or possibly even four, others occur locally at levels averaging −9 ft., −15 ft., −34 ft. and −43 ft. O.D. In only one section do as many as five peats occur in superposition. Two sections have four, seven have three and one shows only two.

At East Greenwich a peat-layer is a frequent feature of the bore-sections. In 28 bores the upper surface of the peat varied in level between + 1 ft. and −11 ft. O.D. The values fall into two distinct groups:—

No. of Values	*Extremes*	*Arithmetic mean*
22	+ 1 ft. and − 4 ft.	− 1·9 ft. O.D.
6	− 7 ft. and − 11 ft.	− 8·7 ft. O.D.

It would appear, therefore, that two distinct levels are involved, though no section shows both in superposition. They are separated by a well-marked gap, without a single value falling between −4 ft. and −7 ft. O.D.

Unlike the bench-levels, which show a falling gradient downstream, the peats, having grown on the surface of the tidal part of the floodplain, are practically horizontal. The two peat-levels at East Greenwich, therefore, probably correspond with the two uppermost at Tilbury, viz. those at −3·4 ft. and −9 ft. O.D.

The lower Tilbury peats are not represented at East Greenwich because, when they were forming, the tide (and the consequent aggradation) had not yet reached so far up the river as to produce a level, poorly-drained surface to the floodplain at East Greenwich.

Rough geological dates may, perhaps, be assigned to the various deposits concerned, which may, from time to time, yield evidence of human occupation or industry.

Following Zeuner's[1] relative dating of the buried channel erosional and aggradational stages, the higher bench (−25 ft. O.D. at East Greenwich) corresponds to the downcutting due to the low sea-level of Last Glaciation II (=Würm II). Aggradation deposits on this bench reached nearly to O.D. in the following Second Interstadial, but the low sea-level of Last Glaciation III (= Würm III) caused a further erosion to the −33 ft. O.D. level at East Greenwich, with destruction and disturbance of some of the deposits on the earlier bench. The gravel filling the deepest channel, therefore, belongs to the earlier Postglacial, at least as regards its lower parts, and should contain the British human industries equivalent in time to the Hamburgian of the Continent. The remainder of the deposits (apart from any lying on the higher bench which

[1] Zeuner, F. E., *The Pleistocene Period*, London, 1945, p. 134.

may have remained undisturbed since the Second Interstadial) belong to the Flandrian Transgression and are all Post-glacial in date. In the absence of good visible sections revealing lateral stratigraphic relationships and giving an opportunity to collect fossils, it is almost impossible to assign a particular deposit to a particular phase of aggradation and to be sure that no later disturbance has taken place; for the deposits lying on a bench are not necessarily immediately sequent in time to its cutting.

From the sections at Tilbury it is evident that the rise in sea-level to its present height was intermittent, the active periods being represented by strata of sand, silt and clay and the intervening pauses by beds of peat. We know from the Maglemosean harpoon dredged from the peaty bed of the North Sea between the Leman and Ower Banks[1] that the sea-level was still very low when the Maglemose culture was flourishing, so that the deposits of the Tilbury and East Greenwich sections would mostly correspond to stages of the succeeding transgression, equatable, in the main, with the stages of the Litorina transgression in Scandinavia.

It is interesting to note that in Denmark four transgressional phases have been recognised,[2] of which one is as late as the middle of the Subboreal climatic phase.

The alternating clays and peats of the Tilbury sections demonstrate that at least six (and possibly seven) phases of inundation of the floodplain were divided from each other by pauses.

Now the surface of the uppermost peat was occupied by man in Roman times,[3] so that the drowning of this surface shown by the "river mud" must be post-Roman in date. This leaves at least five (and possibly six) earlier stages of inundation to be accounted for. Working backwards, the deposits between the uppermost and the second peat (−3·4 ft. to −9 ft. O.D.) would correspond with the final Litorina phase contemporary with our later Neolithic and Bronze Ages. The preceding three phases of flooding and peat-formation would fall within the Atlantic climatic phase proper, corresponding to the later Mesolithic and the transition to the Neolithic, while the two deepest phases (if the present argument is valid) should belong to the latter part of the Boreal climatic phase and be contemporary with late Maglemosean culture.

This dating can only be regarded as tentative, on the evidence at present available, but, as an attempt at a chronological sub-division of the Thames alluvium, may afford a basis for further investigation and discussion.

[1] Evans, H. Muir, *Proc. Preh. Soc. E. Anglia*, VII (I), 1932, p. 131.

[2] Iversen, "Undersøgelse over Litorina Transgressioner i Danmark," *Medd. Dansk. Geol. Foren*, IX, 1907, p. 2; Institute of Archaeology, *4th Annual Report*, p. 48.

[3] King, W. R., and Oakley, K. P., "The Pleistocene Succession in the lower part of the Thames Valley," *Proc. Prehist. Soc. Gt. Britain*, II, 1936, p. 31 (quoting Dartford Memoir, p. 110).

Daggers as Type Fossils in the French Early Bronze Age

By N. K. Sandars

In 1935 Professor Childe[1] described a copper, and still more a bronze, age as indicating "specialisation of labour and the beginnings of regular foreign trade," and added that "the sporadic importation of manufactured metal objects need not denote such dependence on external trade as should merit the designation Bronze Age." Application of the first condition to Western Europe shows the Early Bronze Age to be of its nature dis-continuous and limited. In France it is found only in the so-called Rhône culture and in Brittany. Sporadic importation, however, occurs widely. Some areas no doubt remained formally neolithic until the metallurgical revolution of the Late Bronze Age; for example the Paris Basin, the Plâteau de Ger, and much of central France. In the Midi on the other hand, though early copper and bronze finds are few, there is evidence of a desire to obtain and imitate precious materials or objects which gives to the local "chalcolithic" something of the character of a bronze age as defined above.

The chronological divisions of Déchelette's great Bronze Age volume are still valid, but recent work in France, not always so easily accessible in this country, has modified some aspects and re-emphasised others, so that a few notes regarding the first two divisions may not be out of place.

Since flat axes are notoriously long-lived and the earliest metal beads and awls not distinctive, it is daggers that best illustrate changes in technique, usage and sometimes culture.

I

West European Daggers (the tanged dagger of Déchelettes's Bronze Age I):

Without here attempting a comprehensive register of these daggers in France, the principal associations can be shown to be fairly consistant.

[1] *P.P.S.*, 1935, I, 1.

Beaker	*Barbed and tanged arrow-heads*	*V-perforated buttons*	*Gold*
Fontbouÿsse, Gard.[1]	Fontbouÿsse	Fontbouÿsse	
Saint-Eugène, Aude[2]	Saint-Eugène		Saint-Eugène
Bernet, Gironde[3]	Bernet		
Trizy, Deux-Sèvres[4]	Trizy		Trizy
Kercazic, Morbihan[5]			
Penquer, Finistère[6]			
Déhus, Guernsey[7]		Bounias, B. du R.[8]	

Other associated finds are: segmented bone beads (Saint-Eugène and Cabut),[9] callaïs (Saint-Eugène), an engraved bone tube (Cabut), ribbed bead and hammer (Bounias), whetstone or bracer (Penquer). Eight daggers, including one from Hérault and those from Bernet (found in circumstances which admit a doubt as to its associations) and Déhus, come from chambered tombs, most being more or less ruined passage graves; but Saint-Eugène is a long cist, and Bounias a rock-cut tomb, while Fontbouÿsse is a domestic site. There are daggers also from caves[10]—Grotte des Escaliers, Aude, and the Gardon Valley—and from rivers: the Saône,[11] and the Loire at Nantes.[12] The last-named is rather unusually long (0·42 m. approximately), though tang and blade are flat.

It appears that in France, as in other countries, it was the Beaker folk who used the first tanged metal daggers. Thanks to recent excavation at Fontbouÿsse and at the cave of la Madeleine new light has been thrown on this period in the south of France. The domestic site of Fontbouÿsse seems to have been occupied for a comparatively short time. The occupation level was shallow and sealed by the ash and charcoal from a general conflagration. From two of the houses come daggers of unalloyed copper, the larger 0·214 m. long (Fig. 1), the other 0·105 m. Other finds include rouletted beaker, much typical channelled ware, V-perforated buttons (one half-spool), barbed-and-tanged arrow-heads, saddle querns, stone balls, Salinelle flint (found also in

[1] *Gallia*, Vol. V, Pt. II, p. 236.
[2] *B.S.P.F.*, XXVII, p. 536.
[3] *B.S.P.F.*, XXX, p. 484.
[4] *B.S.P.F.*, XXXVIII, p. 42.
[5] Musée Archéologique, Carnac.
[6] *Rev. Arch.*, 1883, Pt. II, p. 1.
[7] Kendrick, *Archaeology of the Channel Islands, I: Guernsey*, p. 145. On account of proximity to the French coast it seems proper to include Guernsey in this list.
[8] Cazalis de Fondouce, *Les Allées Couvertes de Provence* (Paris, 1873), Mém. I, pls. 3 and 4, Mém. II, pl. 4.
[9] Déchelette, *Manuel* II, p. 141, figs. 56, 145. Ferrier, *La Préhistoire en Gironde*, 1938, p. 306.
[10] Héléna, *Les Origines de Narbonne*, p. 105, fig. 63; *Congrès P.F.*, 1908, p. 628.
[11] *B.S.P.F.*, XXXVI, p. 407.
[12] In Nantes Museum (reference from Mr. S. Hood); a similar flat dagger 0·35 m. long from la Obispa, near Burgos, is figured by Pidal, *Hist. Esp.*, I, p. 787.

the chambered tombs of Hérault), and a small ring and ingot of metal; but no pottery engraved after firing nor pan-pipe lugs. With this, the simplest form,

FIG. 1. FIG. 2. FIG. 3. FIG. 4.

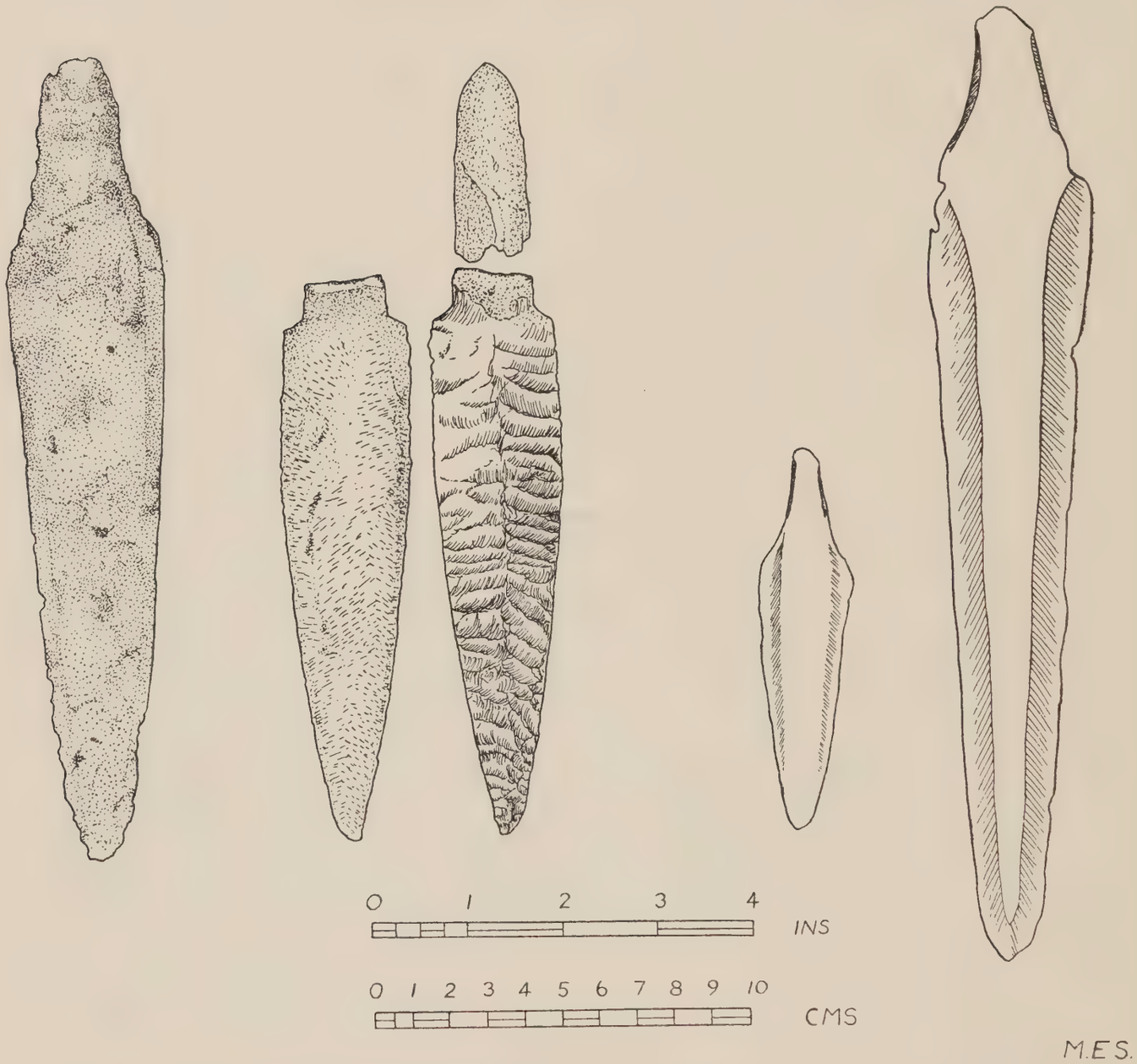


FIG. 1.—West European dagger, Fontbouÿsse, Gard.
FIG. 2.—Flint copy of West European dagger, Trou de Viviès, Aude.
FIG. 3.—West European dagger, Trizy, Deux Sèvres.
FIG. 4.—West European dagger, Grotte de Bounias, Bouches du Rhône.

can be compared the more advanced dagger from Bounias (Fig. 4). This is one of the group of rock-cut tombs of the Montagne de Cordes, cut in limestone outcrops which were islands surrounded by marsh and lagoons until the eleventh

century. Some were provided with port-hole slabs, and all were communal burial places containing from 10 (Bounias) to 100 (Castellet) bodies, and therefore in use over a considerable period. Nevertheless the inventories agree reasonably well with Fontbouÿsse. From Bounias with the dagger came a bone V-perforated button, a spiral decorated bead, fine lozenge-shaped arrow-heads of flint, a handled cup with cruciform pattern on the base, and a broken stone hammer of a type often associated with copper-working. A complete hammer of the same type is the only find recorded from the Grotte des Fées; they were produced at the factory site of Malancène, Veaux, and elsewhere in the region. The flint-work connects the Montagne de Cordes sites with the chambered tombs of Languedoc, while gold, callaïs and ivory point to more distant contacts. Copper and lead mines are found in Hérault, and there is some evidence for believing the copper mines at Bellavade[1] to have been worked in the "Bronze Age."[2]

The little bronze dagger from the long cist of Saint-Eugène has been much whetted down but seems to belong to the same type, but the number of interments (300) does not allow so close an association of grave-goods as in some of the other sites. Daggers from the Grotte des Fèes, and le Bousquet d'Orb,[3] Hérault, are exactly similar to Fontbouÿsse, but that from les Escaliers appears to have notches for binding.[4] From Sepulture E of the Trou des Viviès[5], Aude, comes a flint dagger polished on one side, and evidently derived from metal daggers of Fontbouÿsse type (Fig. 2); other finds from the sepulture bear out this assumption; barbed-and-tanged flint arrow-heads, winged beads, callaïs, and a fragment of bronze. Similar flint daggers come from the caves of Gard (Col de Gigeau and Hippolyte),[6] from a chambered tomb (Rascassols), and the cemetery of Perpetairi, Drôme. Analogous objects come from the chambered tombs of Hérault for a definitive study of which we must await Dr. Arnal's forthcoming publication.

Fontbouÿsse and the rock-cut tombs of the Montagne de Cordes can be fitted into the sequence observed at the cave of la Madeleine by Dr. Arnal, to whom I am much indebted for information in advance of publication. The stratigraphy at la Madeleine (Villeneuve, Hérault) was, from the bottom:

[1] *L'Anthropologie*, XXII, p. 415.

[2] Tomb XXX Anghelu Ruju, *Monumenti Antichi*, XIX, p. 26, with beaker and W.E. dagger, half-spool, and V-perf. buttons should belong to this horizon; the tomb is more elaborate or degenerate (?) than any on the Montagne de Cordes.

[3] Information from Dr. Arnal.

[4] Héléna, *loc. cit.*

[5] *But. Assoc. Cat. d'Ant. et. Preh.*, III, 1925, p. 1.

[6] Montpellier, Nîmes and Avignon Museums, information from Prof. Piggott.

I. 0·030 m. "Niveau Chasséen typique," Matera-type pottery engraved after firing, early pan-pipe lugs, wide-rimmed shallow dishes.[1]

II. 1·50m. Similar to I, but without the engraved ware, plain "Lagozza" pottery, later pan-pipe lugs; this layer contained four hearths.

III. 0·02m. "Niveau Pyrenéen"; beaker, V-perforated buttons.

IV. 1·00m. Mixed channelled-ware, Hallstatt, etc., but no Roman material.

Dr. Arnal does not consider la Madeleine quite typical of Languedoc as a whole, since its position near the sea left it more open to foreign contacts. In particular, beaker is not found in tombs of the "Causses," though channelled ware is.[2] Even among the chambered tombs there are marked regional differences: V-perforated buttons in some areas, winged beads in others. In comparing this sequence with the Grotte de Bize (Aude), it is not surprising to find engraved pottery appearing relatively later in Aude than in Gard and Hérault; at Bize[3] it occurs in the second post-mesolithic layer on the same sherds as channelling. Cardial ware, though fairly common in the caves—Veredéme, Sable, Latrone, etc.—has not so far been found on sites examined stratigraphically except for one sherd from Bize II, whereas in Liguria it stands at the beginning of the series.[4] The local channelled-ware appears first in an early metal context with beakers and the West European daggers, and is also found extensively later (as Déchelette pointed out and Savory[5] has recently emphasised), notably in the presumably Bronze Age dry-stone chambers in tumuli of the Cantaperdrix[6] cemetery, and remained in use into the Late Bronze Age.

The succession in Provence and Languedoc can thus be summarised:

I. Engraved pottery, plain "western" and pan-pipe lugs presumably derived from upper Italy (Madeleine I): to which may be added Cardial ware, known only from caves. Engraved ware then disappears from the south but reappears, perhaps a little later, at the Camp de Chassey, and eventually reaches Normandy—Fort Harrouard and the Camp de Catanoy.

II. Plain pottery and later types of pan-pipe lug showing a continued occupation of the caves by descendants of I (Madeleine II).

III. Beakers, channelled-ware and copper daggers presumably introduced by an incursion from Iberia (Madeleine III). In this phase we have "villages" of round and rectangular houses, and burial sometimes in elaborate rock-cut

[1] *See* Déchelette, *Manuel*, I, p. 556, fig. 204, for similar vessels from the Camp de Chassey.

[2] *Rev. Et. Lig.*, XIV, 1948, 1–3, p. 104.

[3] I have to thank Prof. Childe for information concerning the Grotte de Bize.

[4] L. Bernabó Brea, *Gli Scavi nella Caverna delle Arene Candide*, Bordighera, 1946.

[5] *Arch. Camb.*, 1941, p. 31.

[6] Nîmes Museum.

tombs and "dolmens," and occasionally cremation among houses (Fontbouÿsse). Of these it is the rock-cut tombs which reflect most strongly the foreign impact. Beaker-ware, like the engraved pottery before it, represented a comparatively short episode, whereas channelled-ware, like plain Western, became entirely naturalised.

Of tanged daggers from the west that from Cabut is 0·154 m. long; with it was the bone tube (figured by Déchelette) and segmented bone beads like Saint-Eugène, also a ribbed bone pendant of a widely diffused type, one form of which is found frequently in the Midi. Cabut was a megalithic chamber containing twelve skeletons.

At Bernet, Gironde, a dagger is reported from an oval barrow, 24 m. by 13 m. and 1·3 m. high, with stone constructions in the barrow. A megalithic chamber near one end contained 150 human teeth, a bone needle, three fine flint arrow-heads with squared barbs, one complete beaker and fragments of others. The dagger is 0·13 m. long with a flat tang and appears to have come from the chamber, though found in a previous season's digging. At the centre of the barrow was a megalithic cist, 2 m. long and containing a contracted skeleton, possibly female, a boar's tusk and two plain round-bottomed pots; the more complete had two ornamental bosses close together below the rim, and the other two horizontally perforated handles.

Trizy, Deux-Sèvres (Fig. 3), is the more developed type with hammered up flanges, but smaller and flatter than Bounias, 0·157 m. as against 0·254 m. The site appears to have been a ruined megalithic chamber with five to six skeletons, horses' teeth, and some pots not illustrated in the report.

At least three early tanged daggers come from Brittany though two of them—Penquer, Finistère, and Kercazic, Morbihan—are not quite typical. The latter is a passage grave with a good beaker, while the Penquer dagger, which is unalloyed copper, comes from a ruined "gallery" with beaker and whetstone or wristguard and a jadeite axe-amulet. The third comes from a ruined chamber under a tumulus in the Lesconil[1] cemetery, Finistère. The Déhus dagger from nearby Guernsey was also probably associated with beaker. It follows that the Breton daggers, like those from further south, belonged to Beaker-folk, whether introduced with them, imported by them, or even manufactured locally. Unfortunately the Breton Beaker-folk are as elusive as they are pervasive, since they used all the main types of burial except the Manio "coffres" and "Armorican" dagger graves. Beakers occur in almost all the richest graves, especially those containing gold, which in turn are usually passage graves. This need mean no more than greater trading enterprise on the part of one section of the population.

[1] In Musée des Antiquités Nationales, S. Germain; *see* Daryll Forde in *Ant. J.*, VII, p. 6.

The distribution pattern is mainly coastal with centres round the Gulf of Lyons, the Gironde, and the Armorican peninsula. Metal finds alone do not provide sufficient evidence to show whether the daggers of the Atlantic seaboard came west from the Gulf of Lyons down the Garonne, or north from Portugal. A study of pottery is required for a solution of this, as of the cultural, problem.

The technological stage for which the tanged daggers stand in France may be represented in Switzerland by "lake-dwellings" at St. Blaise, Neuchâtel (tanged dagger)[1] and Luscherz (Lake of Bienne) (tanged dagger and symmetrical copper double-axe). Hawkes has related these Swiss axes to stone symmetrical double-axes in Brittany and Loire-Inférieur, where they seem to belong to the beaker horizon. The stray dagger from the Saône bed may show the route of this trade, if the Swiss daggers did in fact come from the west.

I do not know of any class of daggers from France comparable to our round-heeled riveted Early Bronze Age daggers. Small triangular riveted daggers, often decorated with grooves, come from some caves and chambered tombs, but seldom in a chronological context; and when this is the case it is usually not a very early one. A grooved dagger from a tumulus at Clucy,[2] Jura, cannot be much earlier than the Middle Bronze Age since trefoil pins, like those from Liquisse (*see* below), were found with it. The much-corroded riveted dagger from the Fontaine-le-Puits (Savoie) may be earlier. Another from a burial at Rame, Hautes Alpes,[3] found with spatulate axes not of the earliest type, is better compared to a derivative from a type of Swiss dagger. Others may be much later, and are often so small as to be knives rather than daggers.

II

Triangular Daggers with Metal Hilt: The Rhône Dagger

The triangular dagger with metal hilt has long been accepted as indicative of a full Early Bronze Age. Ünze,[4] analysing these daggers into regional variants—Italian, Swiss, Rhône, Unětician and Oder-Elbe—has shown that no one can be proved earlier in origin than the others. He has also shown that all the main variants follow close upon the Beaker period wherever their distributions coincide.

The earlier Rhône daggers (Fig. 5) have a flat triangular blade with an even number of rivets, usually six, but sometimes eight or four. The characteristic

[1] *B.S.A.*, XXVII, p. 141. Vouga, *La Néolithique lacustre ancienne*, plate xxiv, p. 90; Reinerth, *Die jüngere Steinzeit der Schweiz*, p. 107, fig. 31, 4, 5.

[2] Déchelette, *Manuel* II, p. 137.

[3] *Ib.* II, p. 135. Fontaine-le-Puits; *Mat.*, IX, 1877, p. 155. Rame.

[4] Ünze, *Die frühbronzezeitliche triangularen Vollgriffdolche*, Berlin, 1938.

ring-rivet is in two pieces, pin with head, and ring or collar through which the pin is riveted onto the hilt. Grip and hilt-plate are usually in one piece, the grip often hollow-cast over a clay core. A different technique was used for

FIG. 5. FIG. 6. FIG. 7. FIG. 8.

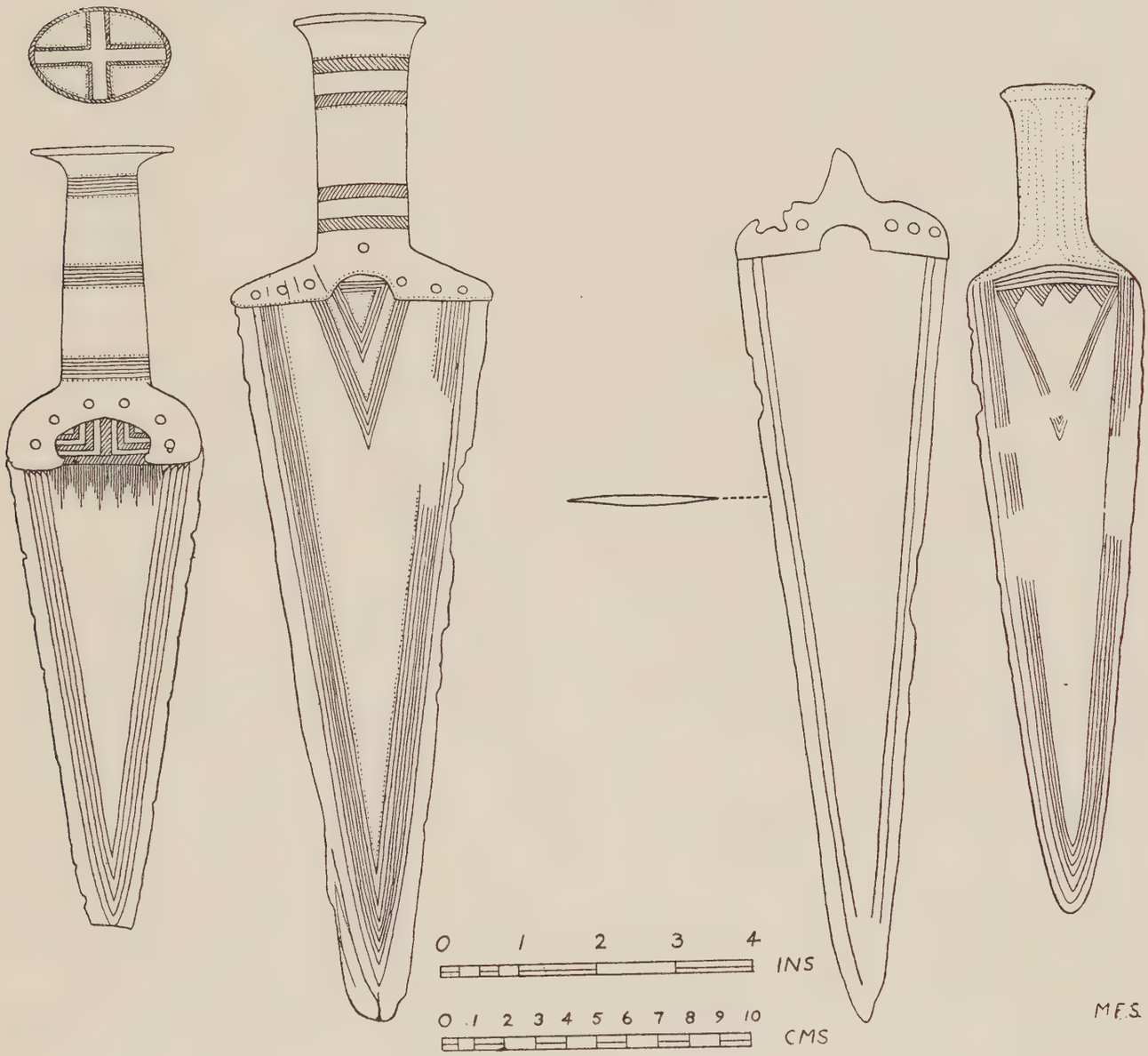


FIG. 5.—Rhône dagger, Crussol, Ardèche.
FIG. 6.—Oder-Elbe dagger, Gaubickleheim, Kr. Oppenheim.
FIG. 7.—Armorican dagger, Remedon, Côtes du Nord.
FIG. 8.—Kladow, Kr. Landesberg a. d. Warthe.

casting Swiss-type hilts and another again for the Unětician. The top of the hilt-plate into which the heel fits is semi-circular, in the lower edge is an oval opening, three-quarters closed by the indrawn corners of the plate. The grip is

usually parallel-sided and oval in section, and the pommel a flattened disc. Decoration of the blade is restricted to blood-grooves with a cross-hatched or pounced band running inside and parallel to them. The exposed blade within the hilt-opening is decorated with rows of hatched triangles or lozenges, or—very typically—with a filled half-cross, the filling consisting of alternate hatched and unhatched bands. A line of small pendant triangles provides a lower border. The hilt itself is usually undecorated, but the pommel may have a plain cross incised and pounced. The use of ring-rivets, their even number, and the style of decoration, particularly the cross, distinguish the Rhône dagger from all other metal-hilted types. Thirteen typical examples come from France and western Switzerland, the French ones from départements bordering the Rhône and Saône. There are two from Italy and one also from Italy with mixed Rhône-Italian characters, and from Switzerland one with mixed Rhône-Unětice characters.

All the daggers from France listed by Ünze lack associations. Of those from Switzerland the typologically earliest is from a stone cist at Neyruz (Vaud), found with flanged axes of a type called "Swiss" by Ünze, and common to the Rhône valley, south and north France, but not Brittany. A slightly more advanced dagger from la Bordonette (Vaud) was found with an early spatulate axe, and Ringoldswil near Thun (Bern) (not a closed find) had a spatulate axe of "les Roseaux" type. Rhône and Swiss-type daggers from Strättlingen-Renzenbühl (Bern), are probably contemporary with the celebrated gold-studded axe from that site, and an Unětician axe with semi-circular blade. Vogt's[31] maps show the distributions of these spatulate and Unětician axes to be mutually exclusive save for an area of overlap in the Neuchâtel-Bern region. The distribution of the spatulate axe coincides with that of the Rhône dagger, though only twice are the axes and daggers actually associated, while the Unětician axe is oftener found with later Swiss-type daggers of Ünze's classification as in the ruined corbelled tomb of Donath (Grisons). Of later daggers which have lost their triangular outline and are already developing in the direction of the short sword, that from Bex (Vaud), grave I, was accompanied by a Tumulus type axe. The dagger from the well-known Trassem hoard belongs to the same late development. Two other late daggers from Switzerland show influence from the Oder-Elbe group. Apart from axes, the associates of Rhône daggers stand closest to Straubing groups: racquet and trefoil pins (la Bordonette and Strättlingen-Renzenbühl), and bronze tubes (la Bordonette), though the knot-headed pin from the latter site points to Unětice. Similar bronze pins and tubes occur also on the middle Rhine. Moreover the Mediterranean shell *Columbella rustica*, though not yet actually found in association with a Rhône dagger, is so common in the cists of western

[31] *Festschrift für Otto Tschumi*, Frauenfeld, 1948, pp. 54–8.

Switzerland (Almendigen),[1] like those which do contain daggers, as to be typical of the group; and it is again found in numbers in Adlerberg graves, and in the "Straubing" cemetery at Gemeinlebarn (Lower Austria).

The Rhône dagger is one of the carriers of Vogt's "sheet style"[2] of decoration the inspiration of which he believes to have come from Hungary (Kisapostag) through Straubing (Gemeinlebarn) and the Grisons to the Rhône valley and by an offshoot north to the middle Rhine. The particular filled-cross decoration was evolved locally and first applied to pins and daggers in the Rhône province. Closely allied are the trefoil pins of Jura and Aveyron, the latter outside the territorial limits of the Rhône culture.

This is not the place to discuss the origins of the decorative style which is common to all Ünze's groups of daggers and some of the associated metal objects. Its underlying unity must, however, be remembered, in spite of local variations such as a prediliction for herring-bone in the Unětice culture as against cross-hatching in the Rhône. Ünze argues against its derivation from beaker decoration, since it is absent from Iberian and Breton metal-work, while beakers are rare in north Italy and the Rhône valley north of Lyons. But inferior metallurgical technique might be responsible for the plainness of Breton and Iberian metal-work, whereas patterns on Rhône and Italian daggers are those also of decorated Chassey pottery, particularly the hatched triangle and cross-hatched band, inherited in turn from the engraved Matera-style of decoration. Beaker designs may still lie behind Unětice patterns. The "Rhône style" is still used on the latest daggers and trefoil pins with small bosses, which are certainly Middle Bronze Age.[3] The period is therefore the full extent of A1 and A2 in the European scheme set out by Childe and Hawkes in the *Proceedings of the Prehistoric Society*, 1948.

The famous grave-group of Liquisse[4] in the Aveyron should provide a dating link with the south French sequence. The trefoil pins are good examples of the sheet style; they stand closest to two pins from Geneva and a broken one from Strättlingen-Renzenbühl.[5] On the evidence of the axes from the latter site they should belong not to the first phase, A1, but rather to A2. I cannot find a close parallel for the Liquisse riveted dagger; it should, perhaps, be related to the Tumulus Bronze Culture on grounds of general appearance; there is, however, a rather similar dagger from the Mondsee, and one from Garz, Mark Brandenburg,[6] for which Böhm can give no parallel nearer than the Mondsee. Rather similar daggers come from the *terremare*. The Liquisse

[1] *Altschlesien*, V, p. 96.
[2] *Loc. cit.*, pp. 67–8.
[3] *J.S.G.U.*, 1947, p. 41 (Surin-Lumbrein).
[4] *Rev. Et. Anc.*, XIII, p. 435.
[5] *Altschlesien*, V, p. 96; *AsA.*, 1927, Plate II, 5.
[6] Forssander, *Der ostskand. Norden während der ält. Metallzeit* (Lund, 1936), p. 18, fig. 5; Böhm, *Die Bronzezeit in der Mark Brandenburg*, pl. 20, 2.

amber bead need not come from further than Gard since natural amber is found at Uzès. The flint javelin-head is a type found in the chambered tombs of Gard and Hérault, in north Italy, and in Iberia at Los Millares and Alcalá. The form of tang resembles metal daggers from Alcalá. Another link between Spain, France and Central Europe might be seen in plano-convex bone discs with central perforation and decorated with dot and circles pattern. One of these comes from the beaker level in the stratified cave of Toralla, Lerida,[1] another very similar from the rock-cut tomb of Castellet (Bouches du Rhône)[2] and others from grave 109 Gemeinlebarn, with bronze tubes and *Columbella rustica* shells of Straubing-Adlerberg affinities.

III

Breton Daggers

The other region of France which has a full Early Bronze Age culture is Brittany. This was so fully described, particularly its relations with Wessex, by Piggott in 1938,[3] that I need only refer to some other possible connections of this culture.

First I would stress the essential dissimilarity of the Armorican blades from those of the Rhône (Fig. 7). The features most characteristic of the former (however much they vary in length of blade), are the nearly straight heel, sharp shoulder, projecting tongue (not invariable), and even number of rivets in a nearly straight line either side of a small lunate hilt-plate opening. The hilt of perishable material is sometimes decorated with gold rivets arranged in patterns such as chevrons. (The small metal-hilted dagger from St. Fiacre[4] is not typical of either group.) None of these features, except the even number of rivets, is found on Rhône daggers; they can be better compared with Ünze's Main-Oder-Elbe class (Fig. 6). These have a hilt-plate with flattened shoulder, the lower edge nearly straight, but a little higher towards the centre, with a small semi-circular or half-elliptical opening, the corners never indrawn; round-headed rivets of uneven number in a straight line on either side of the opening, the odd rivet placed above it in the tongue. This tongue is shown on one of the blades from Gaubickleheim[5] and must be present on all complete daggers. The blades are decorated with grooves parallel to the edges, usually

[1] *Ampurias*, VI, p. 39; allied objects are found in the *terremare* and later Swiss lake dwellings.

[2] Cazalis de Fondouce, *loc. cit.*

[3] *P.P.S.*, IV, 1, p. 52.

[4] *B.S.P.M.*, 1898, p. 81. It is not possible to distinguish the decoration on the blade in its present state, but the 1898 drawing suggests Scandinavia as a possible source. See also *B.S.P.M.*, 1902, p. 378.

[5] *Ünze*. loc cit.; Behrens *Bronzezeit Süddeutschlands*, fig. 2, 3.

enclosing a large incised pendant triangle, a form of decoration common on Unětician daggers. The plate opening may be filled with simple lines or small triangles; the grip is decorated with lines, sometimes pounced. The chief dissimilarities between Oder-Elbe and Armorican daggers are the central rivet on the tongue of the former and absence of decoration other than blood-grooves from the latter. A variant of the Oder-Elbe dagger has the hilt cast in one piece with the blade and pounced decoration apparently imitating rivet-decorated hilts like the daggers from Bush Barrow, Wilts.,[1] St. Fiacre, Morbihan, and many others from Brittany; the best example of this variant comes from Kladow, Kr. Landesberg a. d. Warthe (Fig. 8); but there is one also in the Neuenheiligen hoard.[2] The relics associated with the Main-Oder-Elbe daggers are Unětician daggers, halberds, ingot-torques, lockrings, and narrow shaft-hole double-axes; they therefore belong to a northern extension of the Unětician province. On the other hand their relation to the Oder Corded Ware Culture is not clear, but may be close. Between the area of their distribution about the lower courses of Oder and Elbe, and Brittany, I know only the following:

1. A hoard found at Gaubickleheim, Kr. Oppenheim, west of the Rhine above the junction with the Main, comprising two Oder-Elbe daggers, one a blade only, one blade of Italian type, and one with mixed Rhône-Italian features.

2. A triangular dagger from Haguenau, Donauberg 3,[3] has the characteristic Oder-Elbe-Armorican hilt-plate and blood-grooves but lacks the tongue. In the same barrow were an ingot torque, a spiral bracelet and a knot-headed pin.

3. A rather similar dagger with grooves and six rivets comes from the Seine at Paris.[4]

4. A grooved triangular dagger with four rivets from a barrow at Hervelinghen, Pas de Calais,[5] is probably Armorican, but the type of heel is not indicated.

5. Finally a hoard of six Armorican blades, three with tongue, comes from Longues, near Bayeux.[6]

A metal-hilted dagger from St.-Quentin-des-Iles, Eure[7]; resembles most the Italian group[8] and particularly a blade from la Bordonette, C. Vaud, of

[1] Piggott, 1938.
[2] Unze. *loc cit.*
[3] Schaeffer, *Tertres fun. de Haguenau*, I, p. 67, fig. 31.
[4] Now in the Ashmolean, Oxford.
[5] *Mat.*, II, 1866, p. 442. I am indebted to Mr. George Willmot for this reference.
[6] Coutil, *L'Âge du Bronze dans le Calvados*, p. 7.
[7] Coutil, *L'Âge du Bronze en Normandie*, pl. I.
[8] Ripatransome, prov. Ascoli Piceno (Ünze., pl. 15, 390), Parco dei Monaci, Basilicata (pl. 6, p. 22), and la Bordonette, ct. Vaud (pl. 6, 156).

mixed Italian-Rhône characters. It does not resemble either the Haguenau or Armorican daggers.

The daggers are not, however, the only evidence of contact between the middle Rhine and the west of France. Silver occurs in a few Armorican dagger graves but is notoriously scarce in western Europe outside Iberia till a later time; it is therefore interesting to find a grave at Riedesheim, Alsace,[1] containing an extended skeleton, racquet pins, two copper and one silver spiral finger-ring. We might compare with this the dagger grave at Carnoët, Finistère,[2] with silver spirals and a broken pin apparently of racquet type. The absence of silver objects at this period from the south of France suggests Iberia by way of Brittany as a more likely source than Sardinia or the East (Remedello). An ivory plaque with gold nails comes from Moudan Bras,[3] C. du N.; and an ivory ring from the Adlerberg. The likeness between certain Breton pots and those of the Adlerberg Culture has been pointed out by Hawkes.[4] The Adlerberg pots no doubt descend from zoned-beakers, and independent beaker ancestry may account for the Breton ones by a development parallel to our handled beakers,[5] but pots figured by du Chatellier[6] (plate 13: 3, 6, 8), compare well with Behrens (Figs. 20 and 22). In other respects the Adlerberg Culture is related further south to Straubing and Swiss groups already mentioned—perhaps by the Rhône, but in view of the quantity of *Columbella rustica* at Gemeinlebarn and in Switzerland, the upper Rhine is a more probable intermediary. Vogt compares some pottery from the Early Bronze Age "lake dwelling" of Meilen[7] to Adlerberg ware.

There is no continuity in burial rite; for though the owner of the Donauberg dagger was buried in a tumulus, like Armoricans, the Adlerberg graves are flat, though in at least one case an oak coffin was recorded, as in Armorican barrows. If the users of the Oder-Elbe daggers are to be identified with later Oder Corded Ware folk, they were buried, like Adlerberg people, contracted in flat graves, or less often in cists.[8] Some rich tumuli comparable to Saxo-

[1] *Bul. Mus. Hist. Mulhouse.*, 1924; there is a similar grave at Löhningen with silver.

[2] *Les Trésors archéologique de l'Armorique occidentale* and *Rev. Arch.*, 1868, I, p. 364. A silver collar from St. Vallier, Alpes-M., *Mat.*, 1877, p. 291, is not sufficiently well dated for inclusion among E.B.A. hoards.

[3] *L'Anthr.*, 1934, p. 512; Déchelette, II, p. 360.

[4] *Prehistoric Foundations*, p. 314.

[5] Compare Huggate Barrow 264, *Hull Museum Catalogue*, p. 96, No. 944 and du Chatellier, *La Poterie . . . en Armorique*, pl. 13.

[6] Du Chatellier, *loc. cit.;* Behrens, *op. cit.*, figs. 20, 22.

[7] "Frühbronzezeitliche Keramik," p. 45, *Jb. d. schweiz. Landesmuseums*, Zurich, 1937, p. 78.

[8] Sprockhoff, *Die jüngere Steinzeit in der Mark Brandenburg*, pp. 72, 81.

Thuringian royal graves are also known from the region, and are already Bronze Âge.

The knowledge of bronze working probably reached Western France from east of the Rhine.[1] Since the whole of northern France is extremely poor in early metal finds the distance to be bridged between the central European bronze-using centres and Atlantic coastal districts is great; but it is not in fact much further to Brittany from the middle Rhine than from the Jura where the nearest Rhône culture graves are found; nor are these Jura graves so typical of that culture as the stone cists of western Switzerland. It has already been said that no axe typical of the Rhône culture, neither earlier Swiss-type nor later spatulate-type, reached Brittany. There is, I think, at least as good a case for contact of some sort between Brittany and the Rhine as between Brittany and the Rhône, whether across northern France, down the Rhine and by sea,[2] or even by way of lowland Britain. The middle Rhine, as we have seen, was also in touch with the Rhône culture, but through Straubing and central Swiss links, not through Franche Comté or Burgundy.

At the same time indications of Breton-Iberian contacts are not wanting. Silver points to south-east Spain, but the daggers figured by Siret[3] with silver rivets are quite unlike any from Brittany. There is a small triangular dagger found with a halberd and two silver pendants from El Algar sepulture 77, which appears to have a tongue like Armorican blades, but in this case with a rivet in it. A dagger from Fuente Alamo I, also with a halberd and a gold bracelet, has four grooves down the blade; it is the only Algaric dagger with decoration; the majority are quite unlike any referred to in this paper. If these daggers show contact between the two regions, they were probably brought south in return for Iberian goods. A better link is a quite typical Armorican dagger, but with silver rivets, from Asturias.[4] Déchelette mentions a dagger with silver rivets from a grave at Cissac, Gironde[5]; and there is a good Armorican blade with tongue from the Loire at Nantes.[6] The gold bracelets from Rondossec, Morbihan; and St.-Laure, Deux Sèvres[7]; can be paralleled in Galicia in a

[1] Blood grooves on blades are thought to imply use of a closed mould (Ünze., 5), whereas the flat-tanged dagger could be made on an open hearth.

[2] I only know of one comparable grooved dagger from Holland figured by van Giffen (*Die Bauart der Einzelgräber*, pl. 19, 111) and this is closer to the Unětice class.

[3] *Les Premiers Ages du Métal*, pls. 30, 34, 39.

[4] I am indebted to Prof. Childe for knowledge of this dagger.

[5] Déchelette, II, p. 366.

[6] In Nantes Museum. The Singleyriac group figured by Déchellete, II, 142, has nothing distinctively Breton about it. Two metal-hilted daggers from Madrid Museum, figured by Cartailhac, *Les Âges préhis. de l'Esp. et Port*, p. 224, are of Italian type.

[7] *Mat.*, 1867, p. 250; le Rouzic, "Bijoux en Or," 1931, figs. 1–2.

bracelet from Pulsera de Melida,[1] and there is of course the faience bead from Parc Guren, Morbihan.

The Armorican dagger graves must represent approximately the same period as the Wessex culture, but none are likely to be so early as the earliest Rhône daggers of Neyruz type.[2] It is noteworthy that the richest Armorican graves such as Kergourognon, C. du N. and Carnoët contain, as well as triangular daggers, long ogival blades of later type.

Piggott emphasised the chronological overlap of dagger-graves and megaliths in Brittany, and sheet gold work, including bead and button-covers, from Breton passage-graves has been compared to Wessex finds. If the apparently invariable association of gold with beaker in Brittany is chronologically valid, it shows the beaker-copper dagger horizon to be at its lower extremity not far removed from the full Bronze Age. The same applies to S.O.M. cists like Kerlescant and Niquiniel-St.-Nizon, Morbihan,[3] with beakers and Grand Pressigny flint which appear to be contemporary. There can be only one reason for this sudden concentration in Brittany; the exploitation of copper deposits and the commercial prosperity that resulted and which is demonstrated in the rich furnishing of graves. It is probable that Brittany also had a limited source of tin ore. In Vannes Museum there is a fibrolite axe of a usual type found in an open quarry of cassiterite. Access of political power is demonstrated by the Armorican-Wessex continuity. Is it too fanciful to attribute the not altogether satisfactorily explained wealth of the latter to a partial control of Breton copper and tin resources? But eventually the initiative was lost, the main trade routes shifted and the connection with this country was interrupted. The exaggeration of the Armorican dagger into huge, ceremonial pieces like the swords from Plougrescant[4] show full decadence, while four-handled Armorican pots remained in use till the Hallstatt Iron Age.

Owing to geographical factors the Rhône valley was never so isolated but came into the later Tumulus sphere (Reinecke C/D2). In the south, Provence and Languedoc stagnated after their early brilliance; while large areas of the rest of the country remained essentially neolithic. There is little to show of an Early Bronze Age at Fort Harrouard, and an occasional dagger or a few flat axes from Normandy or Burgundy represent no more than those sporadic imports which we have dismissed from our Bronze Age category.[5]

[1] Pericot, *Historia de l'España*, p. 232.

[2] See above; the Crussol dagger, illustrated in fig. 5, is of the same early type.

[3] *B.S.P.M.*, 1904, p. 302.

[4] Pidal, op. cit., p. 786, has a blade with grooves and tongue 0.43 m. long from Cuevallusa Ogarrio, Santander, which belongs to the same exaggerated type.

[5] I have to thank Prof. Childe for much help in the preparation of this paper, also Prof. Piggott for help and for the photograph from which the drawing of the Fontbouÿsse dagger was made.

Table showing approximate correlations:

Iberian Peninsula	France		Central Europe
	Brittany	Provence	
Almerian I		Engraved, plain	Danubian
II		Western and Cardial pottery	Cortaillod Michelsberg
	I (Chassey: early ware)		
Los Millares (Beakers)	Beakers	Beakers, Channelled Ware Fontbouÿsse, Bounias	Oder Corded Ware Beakers Zoned Beakers
	Early Rhône Culture		Reinecke A1
El Algar	Armorican Bronze Age	Full Rhône Bronze Age	Reinecke A2-B

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